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Mon"omet'allism. See BIMETALLISM.

Monon"gahe'la River. See OHIO RIVER.

Monop'oly. See TRUSTS.

Mon'orail", an elevated railway, on which the cars are suspended from the single rail on which they run. The rail is supported by steel trusses. A railway of this pattern is in successful operation in Berlin, and several points are claimed in its favor. It can be operated with less power; it can turn sharper curves; and there is less danger of derailing the cars than in the old system. Several attempts have been made to operate surface cars on a monorail, the car being kept in an upright position by a large gyroscope (See GYROSCOPE), but they have not been practicable.

Mon'otype. See TYPESETTING MACHINE, subhead *The Monotype*.

Monroe, *Mun ro'*, **James** (1758-1831), fifth president of the United States, born in Westmoreland County, Va. His ancestors were of Scottish origin and came to Virginia as early as 1650. He entered William and Mary College, but his course was interrupted by the Revolutionary War, in which he served, being present in several important battles and attaining the rank of lieutenant-colonel. After the war he studied law under the direction of Thomas Jefferson, to whom he owed much throughout his life in the way of friendship and preferment.

In 1782 Monroe was elected to the Virginia Legislature, and from 1783 to 1786 he served in the Continental Congress, where he was a popular and influential member. He was again elected to the State Legislature in 1786. In 1788 he opposed the ratification of the Federal Constitution in the Virginia convention, on the ground that it conferred too much authority upon the central government. He became United States senator in 1790, serving until 1794 as a prominent Anti-Federalist and opponent of Washington's administration. In the latter year he was appointed minister to France, but was recalled two years later because of public utterances which Washington regarded as indiscreet. His recall occasioned bitter party feeling, and he wrote a defense of his conduct.

From 1799 to 1802 Monroe was governor of Virginia. He was sent back to France in 1802 as special envoy to assist our minister there, Robert R. Livingston, in negotiating the purchase of Louisiana, which was accomplished in the spring of 1803. He then went to London as minister at the court of St. James, where he remained until 1807. Returning home, he was again elected to the Virginia Legislature, and became governor once more in 1811. He resigned the same year, however, to become Madison's secretary of state, and served in this capacity for six years, including the entire period of the War of 1812.

In 1817 Monroe succeeded Madison as president of the United States, and four years later was reelected for a second term, with only one electoral vote cast against him. As president he surrounded himself with the best statesmen of his time and dealt ably with public questions. The most notable events of his administration are the purchase of Florida from Spain in 1819, the Seminole War, the visit of Lafayette as the nation's guest, the recognition of the independence of Mexico and the South American republics, and the enunciation of the Monroe Doctrine. His administrations are known as the "Era of Good Feeling." See MONROE DOCTRINE.

Monroe, La., a city and the parish seat of Ouachita Parish, 55 m. e. of Shreveport and about 155 m. n.w. of Baton Rouge, on the Ouachita River and on the St. Louis, Iron Mountain & Southern, the Queen & Crescent Route and other railroads. There is steamboat communication with several towns on the Ouachita River. The section in which it is located is highly productive agriculturally, and the cotton and lumber industries lead all the rest. In the lumber mills, cotton mills and compresses, cottonseed-oil mills, brickyards and woodenware factories the chief industrial interests are centered. There

is an important trade in cotton and lumber. The city has a handsome Federal Building. Population in 1920, U. S. Census, 12,675.

Monroe Doctrine, the term applied to the policy of the United States regarding foreign interference in the affairs of any nation on the American continent. It was first distinctly expressed in President Monroe's message in 1823, from which fact it takes its name. It declares in substance that the United States is the paramount power in the Western Hemisphere and that it will regard any attempt on the part of a European power to gain a foothold by conquest or to acquire any new establishment on the American continent as an act hostile to the United States. The Monroe Doctrine applies only to territorial aggression by foreign powers and is based upon two passages in the message. The first referred to the boundary lines in the Northwest, then in dispute between Russia, Great Britain and the United States. The second related to the so-called Holy Alliance, consisting of Russia, Austria, Prussia and France, which aimed to interfere in America to restore to Spain the South American colonies that had gained their independence and been recognized by the United States.

The reality of this new factor in world diplomacy was proved at the close of the Civil War when the French had all but placed Maximilian upon the throne of Mexico. The invaders withdrew, at a signal from the United States, leaving Mexico under the government of its own people. Another event was the Venezuela episode of 1895, in connection with which the United States led Great Britain and Venezuela to refer their dispute to an arbitrator.

On Aug. 2, 1912, the United States Senate resolved: "That when any harbor or other place in the American continent is so situated that the occupation thereof for naval or military purposes might threaten the communications or the safety of the United States, this government could not see without grave concern the possession of such harbor by any corporation or association which has such a relation to another government, not American, as to give that government practical power of control for national purposes."

This action of the Senate grew out of the report that a stretch of territory bordering on Magdalena Bay, Mexico, might be acquired by a Japanese company.

Monsoon', a wind resulting from the unequal heating of extensive areas of contiguous bodies of land and water, and which changes regularly with the months or seasons. India and the southeastern part of Asia afford the best illustration of monsoon-swept land areas. During the hot season this vast territory becomes heated, while the temperature of the adjacent waters remains almost unchanged. Somewhere high above the surface along the line of junction of the warm air overlying the land and the cooler air of the sea, the latter begins to descend in an oblique course, displacing the lighter and warmer air. This warm air, after becoming cooled in high altitudes, finally falls by gravity, and the circulation is sustained throughout the season. In winter the movement of the air currents is reversed; the land, subject at all times to extremes of temperature, now becomes cooled to a point below the sea, and a surface outflow of air toward the ocean results. Regular seasonal changes in the direction of the wind similar to the Asiatic monsoon occur in Texas, Brazil, Europe, Africa and Australia. See LAND AND SEA BREEZES.

Montagu, *Mon' ta gu,* **Lady Mary Wortley** (1689-1762), an English writer, eldest daughter of Evelyn Pierrepont, later Duke of Kingston. In 1712 she married Mr. Edward Wortley Montagu, whom in 1716 she accompanied to Turkey in his official capacity of ambassador at Constantinople. She there wrote her famous *Turkish Letters.* Upon her return she quarreled with Pope, who, with Addison and Congreve, was among her intimate friends, and the

poet often attacked her in his writings. While in Turkey, Lady Montagu learned of inoculation for smallpox, and this practice was introduced into England largely through her efforts.

Montaigne, *Mon tane',* **Michel Eyquem de** (1533-1592), a distinguished French essayist, born in the Château Montaigne, in Périgord. In accordance with his father's ideas, he was taught and allowed to speak only Latin from earliest childhood. Having studied law at Bordeaux, he was Parliamentary counselor from 1557 to 1567, meanwhile serving as gentleman of the chamber to the king. In 1571 he retired to his ancestral estate, where he studied the various schools of Greek and Roman philosophy. Later he traveled through Germany, Switzerland and Italy, partly to escape the plague and partly for the improvement of his health, while in Rome being received with great honors by the Pope. After a last visit to Paris, he lived in retirement in his château. Montaigne's essays continue to be among the most popular of French books. Though not characterized by the reticence or delicacy now demanded, they are remarkable for their display of learning and sound reasoning and for the frankness with which they deal with social questions. Their ethics are those of the ancient philosophers. Translations of the essays exist in almost all European languages.

Monta'na, THE TREASURE STATE, one of the Mountain States, is bounded on the n. by Canada, on the e. by the Dakotas, on the s. by Wyoming and Idaho and on the w. by Idaho.

SIZE. The greatest length from east to west is 550 m. The average breadth from north to south is 275 m. and the area is 146,997 sq. m., of which 796 sq. m. are water. Montana is a little smaller than Colorado and Pennsylvania combined, more than twice the size of North Dakota and the third state in area.

POPULATION. In 1920 the population was 548,889. From 1910 to 1920 there was a gain in population of 172,836, or 46 per cent. The rank of the state in population is 39. Its period of development is just beginning.

SURFACE. The eastern part of the state belongs to the Great Plains region and consists of a rolling plateau varying in altitude from 2000 ft. in the northeast corner of the state to 4000 ft. where it curves westward and meets the foothills of the Rocky Mountains. The rivers have worn deep channels in the surface and here and there isolated hills and peaks appear. In many places the cliffs have been marvelously sculptured by wind and water. In the northern part of the state the plateau extends westward beyond the 113th meridian until it meets the Main Range of the Rocky Mountains. But in the central and the southern parts ranges of low mountains are reached a little east of the central part of the state. Little Belt and Big Belt mountains extending nearly in a northeast and southwest direction east of the Missouri River are the most prominent of those ranges in the central part of the state. Further south are the Crazy Mountains, the first range that one meets in going westward over the Northern Pacific Railway.

The Main Range of the Rocky Mountains enters the state about 100 m. east of its western boundary and extends across it in a southeast direction. This is the most important range in the mountain section. It forms the southern boundary between Montana and Idaho, a branch of the Bitter Root Mountains forming the western boundary. The entire mountain region, which covers over 40,000 sq. m., is crossed by ranges extending from the northwest to the southeast, and separated by intervening valleys. These valleys are intersected by cross ranges forming cross valleys and glens, so that the surface of the region is very complex. Some of the most important mountain ranges of the state are the Main Range of the Rocky Mountains, sometimes called the continental divide, Bitter Root, Kootenai, Big Belt, Gallatin, Madison, Cœur d'Alene, Mission and Beartooth. Among the highest peaks in the state are Electric Peak,

11,155 ft., Mt. Powell, 12,000 ft., and Gallatin Peak, 10,967 ft. The sides of most of these mountains are heavily timbered, while many of the valleys are fertile. Above the timber line are Alpine growths which are valuable in conserving moisture. The summits of many of the peaks are crowned with perpetual snow and on the highest of them permanent glaciers are found. Much of this region is comparatively unknown except to the trapper and mountaineer, and it contains a wealth of scenery remarkable for its beauty and grandeur. When the construction of railroads makes the region more accessible it will doubtless be thronged with visitors from all parts of the country.

Rivers and Lakes. The Main Range of the Rocky Mountains forms a divide separating the rivers flowing into the Pacific Ocean from those flowing into the Mississippi River. On the westward slope, across the Rockies, are the Kootenai and Clark Fork rivers, tributaries of the Columbia. Just east of their drainage basin is the St. Mary's River, a tributary of the Saskatchewan, which flows into Hudson Bay. With these exceptions the entire state is drained into the Missouri, which is the most important stream. It is formed by a union of the Jefferson, the Gallatin and the Madison, a little north of Yellowstone Park, and flows northward, then eastward, across the state. Its most important tributaries from the north are the Marais and the Milk, and from the south, the Musselshell and the Yellowstone. The important tributaries of the Yellowstone are the Big Horn, the Tongue and the Powder, each rising in Wyoming. Some of the mountain streams have an exceedingly rapid descent, and, being fed by mountain snows, their waters afford unfailing motive power and unexcelled facilities for irrigation. Flathead Lake, in the northwestern part of the state, is the only large lake within its borders, but there are many small lakes among the mountains noted for their great depth and made attractive by the clearness of their waters.

Climate. Owing to its variety of surface Montana has a varied climate. The heaviest rainfall, from 18 to 20 inches annually, is in the northwestern part of the state and a portion of the mountain regions, as parts of Gallatin Valley and Judith Basin. Most of the rainfall occurs in the spring and early summer, when it is most needed for the growing crops and native grasses. The average rainfall for the entire state is 15 inches. Montana lies between the 45th and 49th parallels of north latitude, so that the state lies in the temperate zone. In this zone the summers are generally short and hot and the winters long and cold, but in Montana the climate is more equable. The elevation of the land tempers the summer heat, and the chinook winds (See Chinook) moderate the winter cold. These winds come from the Pacific Ocean and lose their moisture as snow or rain on the western slope of the mountains. On the eastern slope they have become dry and warmer and are typical Montana chinooks, causing sudden rises in temperature. In most places irrigation is advantageous and in many places it is essential.

Minerals and Mining. Montana has been known chiefly as a mining state. Ever since the pioneer days when gold was discovered in 1862, mining has been one of the chief industries, the principal metal products being copper, silver, gold, zinc and lead. Gold was at first the leading mineral, next silver, but for a number of years the copper output has outstripped that of both gold and silver. Montana shares with Arizona the first place of copper production in the United States. The modern way of mining is to use a dredge boat which does it own digging and washing, the power being supplied by electric plants located on some mountain stream. The largest copper mine is at Butte, the largest city in the state and the seat of the greatest mining camp in the world. The immense smelters where the Butte ores are reduced are at Anaconda and Great Falls. The most important copper mines are in Silver Bow, Broadwater, Jeffer-

son and Beaverhead counties. Gold is chiefly found in Deer Lodge and Madison counties, and the famous "Last Chance Gulch" is located in the southern part of Lewis and Clark County. Large quantities of silver and gold are also obtained from the copper ore. Lead and zinc are found in many of the counties in the mountain sections. Montana is rich in coal deposits. More or less workable fields have been found in 28 counties.

The coal underlying the eastern portion of the state is lignitic and of inferior quality, but that in the mountain districts is bituminous, which is of more recent origin than lignite. The principal coal mines of the state are at Red Lodge, Stockett, Belt, Bridger and Roundup. These coal formations occur near the surface and cover an area of thousands of square miles. Granite, sandstone and limestone are abundant in southern Montana. At Columbus is a sandstone from which excellent grindstones are made. Gypsum mines are in operation in Carbon and Cascade counties. Sapphires are found along the Missouri River in Powell and Granite counties, and the mines on Yogo Creek in Fergus County are considered the most valuable in the world.

Forests and Lumber. About one-fourth of Montana is forested. There are extensive forests of yellow and white pine, Douglas spruce, fir and tamarack among the mountains, and cottonwood and willow grow along the streams in the plains. In the arid region stunted red cedars are found along the water courses. The United States Government has set apart large sections of the forest area for national forests, the total amounting to 20,000,000 acres and taking in parts of 25 counties. Among these natural forests is Glacier National Park, embracing about 14,000 sq. m. in Flathead and Teton counties (See Glacier National Park).

Notwithstanding the large amount of timber, lumbering is not yet an important industry. This is owing in part to the predominance of the mining industry and in part to the fact that demands for lumber outside of the state can at present be supplied more economically from the lumber regions in Washington, Minnesota and the Southern States.

Agriculture. The eastern part of the state is excellent grazing land, and raising live stock is the chief branch of agriculture in this part of the state. In sheep raising Montana leads the United States, the conditions being favorable to the production of the best sheep and of high-grade wools. Horses and cattle are also raised in large numbers. The United States army maintains one of its remount stations at Miles City, which is one of the greatest primary horse markets in the country. The breeds of cattle are also constantly improving.

The soil is generally fertile and good crops are raised in many localities without irrigation. Where irrigation is possible the yield is greatly increased. There are numerous irrigation projects in all sections of the state, some conducted by private corporations and others in charge of the United States Government. When all of these are completed something like 2,000,000 acres will be supplied with water (See Irrigation). Oats, hay and alfalfa are the leading field crops, followed in the order of value by wheat, barley, rye and potatoes, flax, apples and sugar beets. The flax-raising and sugar-beet industries are rapidly growing. Fruit raising is largely carried on in the Bitter Root, Kootenai and Flathead valleys. The apples raised in these valleys are of excellent quality. Dry-farming is largely in use. It is practiced where moisture is not sufficient to produce good crops under ordinary methods of cultivation.

Manufactures. The production of flour and gristmill products and the manufacture of beet sugar and lumber products constitute the leading manufacturing industries. In the large mining centers there are shops for repairing mining machinery and tools, and railway shops are located at division points on the various lines for repairing cars and loco-

motives. The great smelters at Anaconda and Great Falls are more closely associated with the mining than with the manufacturing industries. The state has large deposits of limestone suitable for the manufacture of Portland cement, and cement mills are in operation at Trident, near the three forks of the Missouri River. Clay products such as fire brick and tiles are made at Butte, Great Falls, Helena and other places.

TRANSPORTATION AND COMMERCE. The Great Northern Railway extends across the state from east to west. The Northern Pacific Railway follows the Valley of the Yellowstone as far as Livingston, then crosses the mountains by way of Butte and Helena and enters the Valley of the Clark Fork River, which it follows into Idaho. The Chicago, Milwaukee & Puget Sound line crosses the state from east to west a little south of the median line between the northern and southern boundaries. The Burlington has a line entering the state from Wyoming and extending to Billings and Great Falls. The Oregon Short Line extends from Idaho northward to Butte. Each of the trunk lines has a number of branch lines or feeders.

The commerce of the state is large in proportion to the population. Copper, gold and silver are exported in large quantities, and wool, grain and live stock constitute the chief agricultural exports. Manufactured goods, machinery and foodstuffs are imported.

GOVERNMENT. The constitution was adopted in 1889. Women can vote in all elections and can hold any office, having been granted the right of suffrage in 1916. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer, auditor, attorney-general, railroad commissioners and superintendent of public instruction, all elected for four years. The Legislature consists of a Senate of 50 members and a House of Representatives of 104 members. Senators are elected for four years and representatives for two. Sessions are biennial and are limited to 60 days.

The judicial department comprises a Supreme Court of three judges elected for six years, and of District Courts consisting of twenty-eight judges each elected for four years. The judicial districts are created by the Legislature as needed.

EDUCATION. Although one of the newer states, Montana has an excellent educational system, which provides for common schools throughout the state and county high schools wherever they are needed. Over half the counties have county high schools. There are also high schools in all the larger cities. The University of Montana is at Missoula. The state normal college is located at Dillon. The agricultural college is at Bozeman and the school of mines at Butte. The public schools are under general supervision of a state superintendent of public instruction and the schools of each county are under the direction of a county superintendent.

STATE INSTITUTIONS. The schools for the deaf and blind and feeble-minded are at Boulder. There is a state orphans' home at Twin Bridges, a state soldiers' home at Columbia Falls and a state insane hospital at Warm Springs. The penitentiary is at Deer Lodge and the reformatory at Miles City.

CITIES. The chief cities are Helena, the capital; Butte, Great Falls, Anaconda, Missoula, Bozeman, Billings, Livingston, Kalispell, Miles City, Lewistown, Dillon, Red Lodge and Havre.

HISTORY. Montana (mountainous) was visited first by the French in 1742. In 1805 Lewis and Clark explored this territory, the greater part of which was given to the United States through the Louisiana Purchase in 1803. In 1846 the American Fur Company built the first permanent settlement, Fort Benton. Following the rich discovery of gold, 1862, thousands flocked to Montana where, in Alder Gulch alone, the gold-dust yielded $25,000,000 in a few months. In 1864 Montana Territory was organized. On the Big Horn River in June, 1876, the Custer Massacre occurred. Since the era of railroads, Montana has

steadily prospered, and it became a state in 1889.

Montana, University of, at Missoula (1895). In 1881 Congress granted seventy-two sections of land for university purposes in Montana. In February 1893 the State of Montana enacted laws providing for the establishment of the State University at Missoula; the State College of Agriculture and Mechanic Arts at Bozeman; the State Normal at Dillon; and the State School of Mines at Butte. In 1913 the four institutions were combined into the University of Montana.

It now includes the following colleges and schools: College of Arts and Sciences; Schools of Forestry, Business Administration, Education, Journalism, Law, Music, Pharmacy, Public Service Division (including university extension); Biological Station. Yearly appropriation for 1919 and 1920 is $311,000 each year. The total enrollment for 1918-19 considerably exceeds 1000.

Mont Blanc, *Mon Blon,* a mountain peak, the highest in Europe outside of the Caucasus. It forms a part of the Western Alps and its highest point (15,781 ft.) is in France, 7 m. s. of the boundary of Switzerland and 40 m. s. of Lake Geneva. The mountain mass is about 30 m. long and 10 m. wide. It receives its name from its immense ice cap, over 75 ft. deep, the altitude of the line of perpetual snow being 8600 ft. above sea level. Down its sides hang the huge glaciers that feed the mountain streams below, especially the tributaries of the Rhine and the Po. The Glacier du Géant is the largest and it extends almost to the bottom of the Valley of Chamouni on the north. At its base it is called the Mer de Glace. The first successful ascent of the peak was made by Jacques Balmat, a mountain guide, in 1786, many persons having previously perished in the fatiguing attempt. Its summit is now visited by large numbers of tourists. There are two astronomical and meteorological observatories, one on its summit and the other 14,324 ft. up its slopes.

Montcalm, *Mont kahm',* **Louis Joseph de Saint-Véran,** MARQUIS DE (1712-1759), a French general. He was born at Condiac near Nimes, entered the army at 14 and became a captain at 18. He distinguished himself in several European campaigns, and in 1756 he became commander-in-chief of the French troops in Canada. In August of the same year he captured Ft. Ontario, at Oswego, in 1757 he forced Ft. William Henry, on Lake George, to capitulate, and in 1758 he successfully held Ticonderoga with 4000 men against a British force of 15,000 under Abercrombie, repulsing the latter July 8. Lack of troops and supplies forced Montcalm to go to Quebec, in 1759, which at once became the object of concentrated British attack. The celebrated siege of Quebec was begun by Wolfe July 31, 1759. After six weeks he led his men up a precipitous path to the Plains of Abraham, a plateau in the rear of the city, where the two armies met Sept. 13, the French being completed routed. Wolfe was killed in the engagement and Montcalm was mortally wounded, dying a day later, while the place was still held by the garrison. His last words were: "Thank God, I shall not live to see the surrender of Quebec!" He was buried beneath the floor of the Ursuline Convent in Quebec, which city, in 1827, erected a monument to the joint memory of Montcalm and Wolfe.

Montclair', N. J., a city of Essex Co., 6 m. n.w. of Newark, on the Delaware, Lackawanna & Western Railroad and the Greenwood Lake Branch of the Erie Railroad. It is situated on the slope and at the base of the Orange Mountains, and its broad and shaded streets, rising one above another, afford beautiful views of New York City and its harbor. The city is the home of many New York and Newark business men. The upper portion was originally called Speertown when settled by the Hollanders from Hackensack, and the lower part was first called Cranetown, then West Bloomfield, by its English settlers from Newark. The present name was adopted

in 1865. The Montclair Military Academy, two orphan asylums and a hospital are located here. The industrial establishments include electric-construction works, large printing plants, etc. The city is noted for its healthful climate. Population in 1920, 28,810.

Mon'te Carlo, *Kahr' lo.* See MONACO, *Mon' a ko.*

Montefiore, *Mon" te fe o' re,* **Sir Moses Haim** (1784-1885), a Jewish philanthropist, born in Italy and educated in London. In 1824 he retired from the Stock Exchange and began crusading for the amelioration of his race. Having removed the civil disabilities of Jews in England, he became high sheriff of Kent and, in 1837, sheriff of London. The same year he was knighted, and in 1846 he became a baronet. In 1865 he endowed at Ramsgate a Jewish college to commemorate his wife. Sir Montefiore made seven journeys to the Orient in behalf of his people between 1827 and 1875, being everywhere honored.

Montenegro, *Mon te na'gro,* one of the smaller provinces of Jugo-Slavia situated between Herzegovina and Albania, and the Adriatic Sea and Serbia. This little province was the Switzerland of the Balkans. When Serbia, at that time a powerful country, went down in defeat at the great battle of Kossovo, 1387, and Turkey extended her rule over the entire Balkan Peninsula, a number of Serbian tribes, who would neither emigrate nor submit, took refuge in this mountainous section. Shut in from outside help, entirely surrounded by Ottoman Turks, many times attacked by apparently resistless armies, which they always defeated, scorning even nominal allegiance to Turkey or any other power, they maintained savage independence, till they saw fit to unite with Jugo-Slavia, in 1919.

There are about 400,000 Montenegrins. Their characteristics are those of liberty-loving mountaineers who have lived apart and who distrust strangers. Even the women and children are trained in fighting. In past wars the women often took a part by rolling huge rocks from mountain heights on invading enemies. It is not strange that we detect in their customs much that reminds us of primitive tribal times; especially is this true of their conception of royal power. The king was the father and the people his children in a patrial and tribal sense.

Their country is one of the most beautiful in Europe. Every patch of fertile soil is utilized to the utmost of its resources, and good soil is often carried from a distance to form terraces on the hillsides. Extensive forests cover the higher slopes of the mountains, and vineyards and olive groves lie nearer the sea. Elsewhere herds of cattle, sheep, goats, and swine graze upon the hills. Small as their country is, they have done much to keep alive the consciousness of racial unity among the Slavic people, and have not hesitated to align themselves with Slavic people against common enemies. (See JUGO-SLAVIA.)

Monterey, *Mon" te ra',* **Battle of,** an important engagement of the Mexican War, fought in September, 1846, between 6700 Americans, under General Taylor, supported by generals Garland and Worth, and 10,000 Mexicans, under General Ampudia. After a bloody siege of three days, Worth forced the surrender of the chief stronghold of northern Mexico, which he occupied on Sept. 23. However, the honors with which the Mexicans were allowed to capitulate caused considerable dissatisfaction to the American officers.

Montesquieu, *Mon" tes ku',* **Charles de Secondat,** BARON DE LA BRÈDE ET DE (1689-1755), a French political and philosophical writer, born at the Château of Brède, near Bordeaux. He was a brilliant lawyer, and in 1714 was appointed a councilor of the Parlement of Bordeaux. His tastes were rather for travel and independent study than for the routine of official duty, and his writings soon revealed the fact that he was one of the clearest political thinkers of his day. His representative works are keen and analytical, systematic, but popular, and include *Reflections on the Causes of the Rise and Fall of the Ro-*

MADAME MARIA MONTESSORI

MONTESSORI METHOD

man Empire and *Spirit of the Laws,* the latter the work of 20 years and a classic in historical political science.

Montessori Method, an educational system which has grown out of the study and teaching of Madame Maria Montessori, a doctor and teacher of Rome. Dr. Montessori was in 1898 an assistant at the Psychiatric Clinic of the University of Rome; here she became interested in the work with feeble-minded children and began the study of the educational methods used with subnormal and idiot children. The treatment then in vogue for such children emphasized the medical side to such an extent that Dr. Montessori was led to disagree with her associates and to advocate a method in which the pedagogical side was more in evidence. A lecture which she delivered in exposition of her theory excited such widespread comment that she was called upon by the Italian minister of education to deliver a series of lectures to the teachers of Rome on the education of deficient children.

Following this, she became a director of the State Orthophrenic School, which had resulted from her lectures. Here, and in the Medical Pedagogic Institute, where subnormal children both from the asylums and from the public schools were brought, Dr. Montessori spent two years training teachers and observing the children uninterruptedly from eight in the morning until seven in the evening. When some of the feeble-minded children whom she had trained were able to pass the examinations required of normal children of the same age, instead of considering her own work marvelous, Madame Montessori used the result as proof that modern school methods were fallacious, and she at once set about applying the methods used in her school to public schools. This idea she does not claim to have originated; in fact it had been suggested by American educators, but she was certainly the first to put it into actual use. After some years of study Dr. Montessori's great opportunity came when she was asked to organize the infant schools of the model tenements built by the Roman Association of Good Building in the heart of the Roman slums.

The Casa dei Bambini, or Children's Houses, are in many ways like American kindergartens, except that they are located in the tenements or apartment houses and take in only those children living in the building. The Children's Houses have a directress, not a teacher, and her duty, as the name implies, is to direct and observe rather than to teach.

The chief difference between the kindergarten method and the Montessori method is that the one teaches collectively, the other individually. Dr. Montessori believes in the development of the child in the direction of its natural tendencies. To accomplish this she uses no fixed desks and seats but provides instead light tables and chairs which the children may lift from place to place. The children are at liberty to move about as freely as they choose as long as they do no harm; thus they play singly or in groups, as the fancy dictates, and express their own tendencies in their choice of plays. Children between the ages of three and seven are admitted and remain in the school at least from nine until four. In regard to discipline, Dr. Montessori says: "We do not consider an individual disciplined only when he has been rendered as artificially silent as a mute and as immovable as a paralytic. He is then an individual annihilated, not disciplined. We call an individual disciplined when he is master of himself." A child who habitually disturbs others without regard for correction is first examined by a physician; if he is found to be a normal child, he is placed by himself at one of the small tables in a corner of the room. Here he has a comfortable little chair, his favorite games and an excellent opportunity to watch his playmates and observe the advantages of sociability in play.

The lessons of the Montessori school are marked for their brevity, simplicity and truthfulness. The personality of the teacher entirely disappears and the ob-

ject of which she is speaking alone remains in evidence. The great object of the method is to find *spontaneous* activity and not to arouse unnatural effort by repeating the lesson or by correcting an error.

Dr. Montessori's method begins with the training of the senses. The touch is trained as carefully in these normal children as it is among the blind, and it becomes as useful a sense. To train it the directress has rough and smooth objects, letters cut from sandpaper, cylinders of varying weight and size and similar objects. These the children use with their eyes open or blindfolded. The chromatic sense, or sense of colors, is trained by means of tablets wound with colored silk, woolen balls and blocks of varying shades. The discrimination of sounds and the development of the other senses are as carefully looked after. The intellectual education begins naturally with the sense development, and the children learn reading and writing from the same sandpaper letters which they used in their early games. This, however, is a simpler process in Italian than it would be in English, where spelling is less phonetic. Manual labor, physical education, cleanliness, politeness, personal needs, such as buttoning and unbuttoning, lacing shoes and fastening hooks and eyes and automatic fasteners,—these are all parts of the Montessori curriculum. The material which is used has all been devised by Dr. Montessori and is protected by copyright.

Dr. Montessori's method is not so great a revolution in American teaching as in that of Italy. It contains many points not adaptable for use in American schools and many that are criticized by American educators, but its object, "to stimulate life and then leave it free to develop," is approved by all students of pedagogy. Excellent discussions of Dr. Montessori's work are *The Montessori Method*, by Dr. Montessori herself; Smith, *The Montessori System;* Dorothy Canfield Fisher, *A Montessori Mother;* Stevens, *A Guide to the Montessori Method.*

Mon"tevid'eo, the capital and chief port of Uruguay, situated on the northern coast of the Rio de la Plata estuary, 120 m. s.e. of Buenos Aires. It is among the cleanest cities in the world, and the principal street is one of the finest boulevards in South America. Among the buildings are the exchange, the Government House, the Cathedral, a university, several theaters, hospitals and churches. In 1899 arrangements were made to improve the shallow harbor, and by 1908 the new entrance channel admitted large steamers. The construction of an embankment and a new shore line south of the city was begun in 1909. Three extensive dry docks are now connected with the port. Manufactures exist chiefly for domestic purposes; the exports comprise live stock and animal products, wheat, flour, barley, tobacco, fruit and vegetables. The city was founded in 1726. Population estimated 400,000.

Mon"tezu'ma (about 1480-1520), the last Aztec Emperor of Mexico. Because of his merits as warrior and priest, he was elected emperor. In 1519 his realm was invaded by Cortez, whom, influenced by an ancient prophecy, he welcomed until discovering that he was only human. He then planned the Spaniards' destruction, but was himself seized. Though refusing to accept Christianity, he recognized the supremacy of Spain. When the Aztecs revolted against the Spaniards, and Montezuma, instigated by Cortez, tried to appease them, he was assailed. In his humiliation, he refused all nourishment and soon expired. See AZTEC; CORTEZ, HERNANDO.

Mont'fort, Simon de, EARL OF LEICESTER (about 1208-1265), an English statesman, famous in the story of the growth of democracy in England. Henry II, successor of John, violated his oath to observe the provisions of the Magna Charta and acted with even more tyranny than his father. In the uprising of the barons and people, that followed, De Montfort acted as leader, and the royal forces were defeated in the Battle of Lewes (1264). De Montfort now is-

sued, in the King's name, writs of summons to a meeting of Parliament, including not only barons, bishops and abbots, but knights and burghers. Thus in 1265 there assembled the first House of Commons, and for the first time untitled citizens took part in the deliberations of the great national council. De Montfort was killed in a war between the barons and the Royal Party, which broke out later in the same year.

Montgom'ery, Ala., the capital and county seat of Montgomery Co., in the central part of the state, on the Alabama River, 180 m. n.e. of Mobile. It is on the Louisville & Nashville, the Mobile & Ohio, the Atlantic Coast Line, the Seaboard Air Line, the Central of Georgia and the Western of Alabama railroads, and is connected by boats on the Alabama with Mobile and thus with other ports. Montgomery lies in the fertile Black Belt Country and is surrounded by pleasant farming lands. Much money has been expended in improving roads, and those leading into Montgomery are well kept and greatly traveled. In the city the streets are equally well cared for and are excellently paved and shaded. The park reservations include about 100 acres; Oak Park is the largest of these. At the state fair grounds, near the outskirts of the city, the annual state fair is held. The waterworks system is municipally owned; the water supply is drawn from 19 artesian wells and is pronounced exceptionally pure by chemists.

The most important public building is the stately colonnaded capitol, in the hall of which the Confederate Government was organized. In recent years this building has been remodeled and greatly enlarged. Near it stands a fine Confederate monument erected by the women of Alabama. The county courthouse, the Federal Building, the Y. M. C. A. and Y. W. C. A. buildings, the city hall, a Pythian Temple, a Carnegie library and a Masonic Temple are among the interesting public buildings, and the business blocks of the city are modern and attractive; these latter include several new office buildings and hotels. There is a city infirmary; and a hospital, St. Margaret's, under the direction of the Sisters of Charity. The residences of Montgomery, surrounded by wide old-fashioned gardens and beautiful grounds, make it a pleasant city of homes. Aside from its public schools Montgomery is the seat of a state normal school for colored students, the Alabama College for Women and three high schools for boys.

The many railroads and the river, which is excellent for navigation, make this city an important shipping point. It is one of the chief interior cotton markets of the United States and sends out vegetables, fruits, nuts, timber and live stock from its prosperous farms. Montgomery is also a manufacturing center, and here are located six cottonseed-oil mills, woodworking establishments, two sirup plants, carriage plants, seven fertilizer factories and three cotton mills. The milk- and meat-inspection laws and the sanitary system of the city have attracted widespread attention. All foodstuffs are carefully inspected and all garbage is destroyed by a modern incinerating plant.

The site of the city was once occupied by the Indian village of Ecunchatty. A white settlement was established in 1814 and the town was originally called New Philadelphia. In 1819 it was united with New Alabama Town under the name Montgomery, given in honor of Gen. Richard Montgomery. It was incorporated in 1837 and became the capital of the state in 1847. It was the capital of the Confederacy until 1861 and was, until captured by Federal troops in 1865, the seat of Confederate military factories. Its present charter dates from 1905. Population in 1920, 43,464.

Montgomery, Richard (1736-1775), an American general, born in Dublin County, Ireland. He was educated at St. Andrew's and at Trinity College, Dublin, and entered the British army in 1756. He served with credit and distinguished himself in the last French and Indian War; but left the service

in 1772 and settled in New York, where in 1775 he was delegate to the first provincial congress. The same year he became a brigadier-general in the Continental army, was made second in command to Schuyler in an expedition against Canada and seized Montreal. He was killed in the opening of the attack on Quebec. In 1818 his remains were brought from Quebec to St. Paul's Church, New York, where a memorial to him was erected.

Month, one of the 12 divisions of the year. The name is taken from *moon,* referring to one revolution of the moon around the earth. This period is 27 d., 7 h., 43.2 min., or a little less than 27⅓ days. This is the sidereal month. But as the moon also has a motion in connection with the earth, it requires longer for the moon to reach the same position relative to the sun than it had at the beginning of the revolution. This period is 29 d., 12 h., 44.05 min., and is the synodical month. The solar month is 1-12 of the solar year, or 30 d., 10 h., 29 1-12 min. See Moon; Year; also articles on the different months of the year.

Montpe'lier, Vt., the capital of the state and county seat of Washington Co., 40 m. s.e. of Burlington, at the mouth of the north branch of the Winooski River, and on the Vermont Central and the Montpelier & Wells River railroads. It is situated in a beautiful valley surrounded by hills, and in an agricultural region. Valuable granite quarries are also in the vicinity. The city's industries are represented by flour mills, tanneries, creameries, granite and marble works and manufactories of hardware, leather and machinery. It controls a large portion of the trade of the surrounding country, and ships quantities of hay, potatoes, dairy products and poultry.

There are a number of stately edifices, including the capitol, which is built of granite, its dome rising to a height of 124 ft. and surmounted by a statue of Agriculture. Other features of the city are the Wood Art Gallery, the state and the Kellogg-Hubbard libraries and the Montpelier Seminary (Methodist). The first permanent settlement was made in 1787 by people from Massachusetts. It was organized as a town in 1791, and in 1805 Montpelier was selected as the capital of the state. For 40 years it maintained town, village and school district organizations, until 1894, when it received a city charter. Population in 1920, U. S. Census, 7,125.

Montreal, *Mont" re awl',* the largest city of the Dominion of Canada, situated in the Province of Quebec, on the southeast of the Island of Montreal at the junction of the St. Lawrence and Ottawa rivers, 180 m. s.w. of Quebec and 420 m. n. of New York. It is on the Canadian Pacific, the Intercolonial, the Grand Trunk, the Canadian Northern, the New York Central, the Delaware & Hudson, the Central Vermont and other railways. Steamship communication is maintained with British and European ports, as well as with those of the Gulf and Great Lakes. Montreal extends from the water front to and around Mt. Royal, on whose summit, 800 ft. above the sea, a public park of 460 acres is laid out. From the varying levels of the roadway winding up the mountainside the view of the city below is one of great natural beauty and picturesqueness. Not far distant from Mt. Royal are the Laurentian Mountains, Lake St. Louis and the Lachine Rapids, and on the southern horizon can be discerned the Adirondack and Green mountains.

Streets, Parks and Monuments. There are a great number of fine residence streets, many of them forming terraces up the slopes of the mountain. The Lachine Canal winds between the mountain and the river; in the middle of the river rises St. Helen's Island to a height of 150 ft. above water. It is beautifully wooded, commands a fine view of the city, and though formerly purchased for military purposes it is now loaned to the city for use as a public park. In addition to this and Mt. Royal Park are the St. Louis and Lafontaine

MONTREAL

parks and the Viger Gardens. Among the public squares is Place d' Armes, in which stands a bronze monument erected to the memory of Maisonneuve, the founder of Montreal. Dominion Square contains a statue of Sir John MacDonald and a monument to the Canadian soldiers who fell in the Boer War. This was also the site of the ice palace which was stormed by torchlight during the winter carnivals of the past. Jacques Cartier Square has a column and statue of Lord Nelson, and two Russian guns from the victory of Sebastopol; Victoria Square, the site of the old hay market, is at the foot of the Beaver Hall Hill, and has a bronze statue of Queen Victoria; Champ de Mars is the old parade ground of the French and British troops, and the historic Bonsecours Market is still retained as a place of interest.

Public Buildings, Institutions and Societies. Both the public and private buildings are chiefly of substantial, gray limestone, quarried from the mountain. The Church of Notre Dame, one of the largest cathedrals in America, was built in 1824; its size (it accommodates 10,000 people) and Gothic architecture make it an imposing edifice. In one of its twin towers is the famous bell, Le Gros Bourdon, weighing over 11 tons. There are ten bells in all, and the chimes possess great beauty of tone. The Cathedral of St. James is a reproduction, on about one-half the scale, of St. Peter's at Rome. Its sloping roof throws off the winter snows, but other modifications of the plan of the original are slight. There are also the Notre Dame of Lourdes, Notre Dame de Bonsecours, the Church of St. James, the Apostle, St. George's Church, Christ Church Cathedral and the Order of the Grey Nuns. Among secular buildings are the city hall, the courthouse, the custom-house, the Board of Trade, the stations of the Canadian Pacific and the Grand Trunk railways, the Victoria Rifles and Royal Scots armories, the Drill Sheds, the Windsor Hotel, the offices of the Bank of Montreal, the Château de Ramesay, the Fraser Institute, the art gallery, a public library, asylums for the blind and deaf and dumb, the Royal Victoria Hospital, the Montreal General Hospital and the Hôtel Dieu.

There are two distinct systems of public schools, one for Roman Catholics and the other for Protestants. The city is the seat of McGill University, with its many colleges, large museums and library, the Presbyterian College, the Veterinary College, St. Mary's, or the Jesuit College, the Montreal branch of the Laval University of Quebec, the Villa Maria Convent School for girls, the school of the Nuns of the Sacred Heart, Presbyterian and Wesleyan colleges and the Collège de Montreal, or Petit Séminaire.

Commerce and Industries. Montreal ranks next to New York and New Orleans as a port of entry. It has a fine harbor, the quays, docks, wharves of solid masonry extending for seven miles along the water front. By means of the Lachine Canal, together with a system of rivers and artificial waterways, the resources of the Northwest can be transported over a continuous inland waterway from Port Arthur to Montreal, and from that point through the St. Lawrence River to European ports. The Victoria Bridge, built by the Grand Trunk Railway, is almost two miles in length, one of the longest bridges in the world. The graceful cantilever bridge of the Canadian Pacific Railway spans the river at Lachine. The wealth and commercial importance of the city have resulted from the large trade in fur, lumber and grain of the Northwest. Montreal ships more grain than any other port of the continent, except New York and New Orleans, and with the completion of the Georgian Bay Canal the facilities for transportation will be greatly furthered. It is now the chief export center for dairy produce. The Bank of Montreal is one of the greatest banks in the world, and in addition to more than 25 other banks are offices of the principal insurance companies and of the two largest railways of the coun-

try, all of which make it an important financial center as well.

The industrial plants include about 900 factories, whose products are boots and shoes, clothing, refined sugar, tobacco, rubber, machinery, tools, silk, cotton, woolens, paints, carriages, electric goods, sleighs, railway rolling stock and musical instruments. Of the numerous grain mills the Ogilvie Flour Mill is the largest in the British Empire. There are also iron and brass foundries, lead works and lumber mills. The electric street railways, gas and electric-light plants and the system of waterworks are costly. On Mt. Royal is a reservoir hewn out of the solid rock with a capacity of 36,500,000 gallons; from this the city obtains an ample water supply.

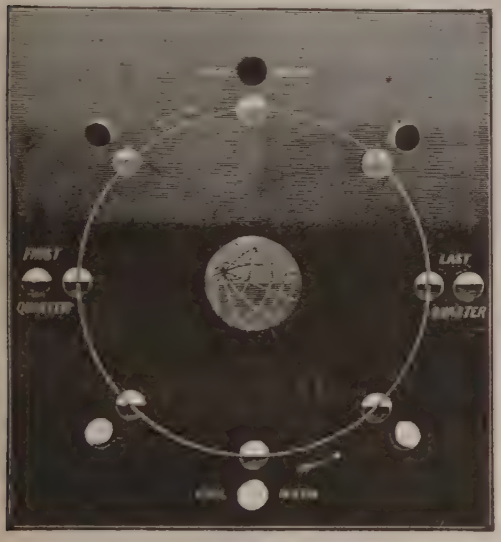
GOVERNMENT AND HISTORY. Montreal returns six members to the Provincial Legislature of Quebec and five to the Dominion House of Commons. It is governed by a mayor and 36 aldermen, elections occurring every two years. In 1535 Jacques Cartier ascended the St. Lawrence River and discovered the Indian village of Hochelaga on the present site of the city. Champlain visited the spot in 1603, found it deserted as a result of the ravages of Indian warfare, and established a trading post there eight years later. Maisonneuve and his band of ardent missionaries arrived in 1642, and the "Ville Marie-de-Montreal" was founded, the place soon to become intimately associated with as noble missionary enterprise and heroism as the world has ever witnessed. The work of christianizing and educating the Indians advanced slowly, and soon the religious phases of life in the town were changed, and it became a military post and a commercial center. By 1672 it was the center of the fur trade. For a century and more, priests, soldiers and traders gave to life in the town respectively its somber, jovial and savage features, and even at present one of the most striking phases of Montreal life is its peculiar mingling of occupations, creeds and races. The more romantic days of pioneer life have yielded, however, to the strenuous demands of its extensive commercial and trading life. It was the seat of the Canadian Government from 1844 to 1849. About three-fifths of the inhabitants are French and three-fourths are Roman Catholics. Population in 1911, 470,480.

Moody, Dwight Lyman (1837-1899), a Christian evangelist, born at Northfield, Mass. He began life as a clerk in a Boston shoe store, where he remained two years, going to Chicago in 1856. He entered earnestly into Christian work in that city and built up a Sunday school of about 1000 children. His work as an evangelist was remarkably successful. A church which was built for him in Chicago was burned in the great fire of 1871, and another, seating 2500 people, was erected. Accompanied by the singer, Ira D. Sankey, he held revival meetings throughout the United States and in other countries, visiting England in 1873 and again in 1882. He was the founder of a seminary for young women, a training school for Christian workers, the Mt. Hermon School for Boys, all at or near Northfield, Mass.; and of the Moody Bible Institute, Chicago. He wrote several religious books.

Moody, William Vaughn (1869-1910), an American poet and dramatist, born in Spencer, Ind. After graduating at Harvard University he became instructor in English literature there, later holding the assistant professorship of English literature at the University of Chicago. His premature death ended a literary career of great promise. His early poems had the dignity, maturity and intellectual quality of a scholarly mind, giving sure evidence, as well, of a genuine poetic gift. Besides a volume of poetry, he wrote two dramas—*The Great Divide* and *The Faith Healer*—the former of which was very successful; an essay on Milton for the edition of Milton's poems which he edited; and, in collaboration with Robert M. Lovett, *A History of English Literature*. Notable among his poems are *An Ode in Time of Hesitation, The Masque of Judgment* and *The Fire-Bringer*.

MOON

Moon, the earth's satellite. The moon accompanies the earth in its revolution around the sun, and revolves about the earth in a nearly circular orbit. Its mean diameter is 2160 m., or a little more than one-fourth that of the earth. It would take 50 moons to make a body as large as the earth, and 80 moons to equal the earth in weight. A man weighing 200 lb. on the earth would weigh about 40 lb. on the moon. The mean distance of the moon from the earth is, in round numbers, 239,000 m. It makes a complete revolution in its orbit in a little over 29½ days, exactly 29 d., 12 h., 44.05 min. This period constitutes the synodical month, and extends from one new moon to another.



PHASES OF THE MOON

The moon makes a rotation on its axis in the same time that it revolves about the earth. The same side of the moon is, therefore, always turned towards the earth. This peculiarity of the moon is easily illustrated by placing any object upon a table and then walking around the table, taking care to face the object while making the circuit. In completing the circuit the observer will turn around once.

The moon is a dark body and shines by reflected light of the sun. At the time of the new moon, when the moon is directly between the earth and the sun, the moon is for a brief time invisible, but as soon as it passes this point the crescent of the new moon appears. This continues to increase until one-half the lighted portion is turned toward the earth and we have the first quarter. From the first quarter the lighted portion continues to increase until the moon reaches that point in its orbit where the earth is between it and the sun, and the whole lighted portion is visible, constituting the full moon. From this point the moon begins to wane and passes in reverse order through the same phases as between the new and the full moon. The accompanying illustration makes this plain. In some latitudes where the atmosphere is very clear one may be able to read by the light of the full moon, but it would take 600,000 full moons to produce a light equal to that of the sun.

When seen with the naked eye, the moon presents dark and light objects, the dark objects forming what is familiarly known as the "man in the moon." The telescope reveals the fact that the light portions are elevations and the dark portions depressions on the moon's surface. By means of the telescope, the moon's surface turned toward the earth has been accurately mapped, and is better known to astronomers than some portions of the earth's surface, such as the interior of Australia and the South Polar regions, are to geographers. The surface is very irregular, being made up of lofty mountain ranges, deep valleys and volcanic peaks, with extinct craters, some of which are estimated to exceed 10,000 ft. in depth. Some of the mountains are estimated to be at least 24,000 ft. in altitude, equaling the highest peaks on the earth. The principal range is the Lunar Alps, and the prominent peaks and craters have been named after leading scientists, as Copernicus, Kepler, Linné and Aristarchus.

By attaching a photographer's apparatus to a large telescope, clear and ac-

curate representations of the moon's surface have been obtained. The accompanying half tone gives a view of the moon at quarter as seen through the great refracting telescope of the Yerkes Observatory at Williams Bay, Wis., and shows the moon as it would appear if seen with the naked eye at a distance of 250 m.

The most careful observations show that the moon has no atmosphere. The most valid reasons for this conclusion are the very distinct outline of objects on its surface as seen through the telescope, and the absence of haze in all views of eclipses and occultations. In each case the disk of the moon is sharply defined. Were an atmosphere present, this would not be possible. There is neither water nor life on the moon.

The moon is our nearest neighbor and exerts considerable influence upon the earth. It is the cause of tides and eclipses, but the superstition that the moon affects the weather has long since been proved false. Notwithstanding this, however, there are many people who are still guided by the phases of the moon in planting their corn and killing their pigs. It was formerly supposed that moonlight was a cause of insanity; hence the terms "lunacy" and "moonstruck." See ECLIPSE; TIDES.

Moore, *Moor,* **George** (1853-), a British novelist and dramatist, born in Ireland. He began his literary career with contributions to periodicals, and in 1877 and 1881, respectively, published volumes of verse entitled *Flowers of Passion* and *Pagan Poems.* Later he became interested in the modern Irish literary movement, and joined with William Butler Yeats in the founding of the Irish Literary Theater. His volume of "confessions," entitled *Hail and Farewell,* contains a candid and illuminating exposition of the movement frequently termed the Irish renaissance. His comedy, *The Bending of the Bough* (1900), was produced by the Irish Literary Theater in Dublin; the following year appeared his *Diarmuid and Grania,* written in collaboration with William B. Yeats. As a novelist, Moore is identified with the French School of realistic fiction, whose most eminent representative is Zola. Moore's other writings include the novels—*A Modern Lover, A Mummer's Wife, Esther Waters* and *Sister Teresa;* and *Confessions of a Young Man, Impressions and Opinions, Modern Painting* and *Memoirs of My Dead Life.*

Moore, Thomas (1779-1852), an Irish poet, born in Dublin. He studied at Trinity College, but won slight honor except fame as a wit. In 1799 he went to London and published his *Anacreon* by subscription, the Prince of Wales playing the part of the patron and accepting the dedication of the poem. His appointment as admiralty registrar at Bermuda failed to please him and he intrusted the duties to a deputy, but in 1817 this deputy's neglect and embezzlement caused trouble, and Moore retreated to the Continent to avoid a debtor's prison. He met Byron in Venice, returned to England in 1822 and several years later was granted both a literary and a civil pension. His lyrics, especially the *Irish Melodies,* were very popular because of their grace and airiness, and his Oriental romance, *Lalla Rookh,* with its vivid local coloring, dazzled his contemporaries and was widely read and translated. He also wrote *The Fudge Family in Paris, The Loves of the Angels, The Memoirs of Captain Rock, The Epicurean, History of Ireland* and the classic *Life of Byron.* His charming lyrics, *Oft in the Stilly Night* and *The Harp that Once Through Tara's Halls,* have long been favorites. Moore enjoyed great popularity in his day.

Moor Fowl, a bird of the Grouse Family. It is about 16 inches long, of reddish-brown color, barred or speckled with black. The nest is made on the ground and a number of spotted eggs are laid. The moor fowl is a favorite game bird in Great Britain, where it is snared for the market, as well as bred for food. It is common on the mountains and moors and is the only bird confined solely to the British Isles.

THE MOON

This is a photograph of the Moon, as seen through the telescope of the Yerkes Observatory

Moors, a name loosely applied to any natives of Morocco, but used more strictly to designate the Mohammedans of mixed descent of the Barbary States. The Arabians conquered these states in the seventh century. The Mohammedans who conquered the Visigoths in Spain came from Africa and were called Moors by the Spaniards. They invaded France but were driven back by Charles Martel at the Battle of Tours in 732. They then settled in the southern part of Spain and set up an independent caliphate in Spain, with Cordova as the chief city. Here for centuries was the best civilization in Europe.

Charlemagne invaded the kingdom, and as the country grew weaker, the little Christian states in the mountains began a gradual conquest of the country. In 1492, by the united efforts of Isabella of Castile, and Ferdinand of Aragon, the last Moorish stronghold, Granada, was taken. Many Moors left for Africa, and those who remained were persecuted by the following sovereigns, finally being banished by Philip III in 1609. As the Moors were the most industrious and enterprising part of the people, their expulsion was one of the chief causes for the decline of Spain. The Moors in the Barbary States were noted pirates until the 19th century. They are a handsome white race, intellectual and courteous, but cruel.

Moose, the largest existing member of the Deer Family, differing only slightly from the European elk. It was once common throughout the United States but is now rarely found south of Maine and Minnesota; it is still abundant in Canada and Alaska. The moose is a powerful, ungainly animal with long legs, large head, somewhat humped shoulders and huge, flattened antlers divided into many irregular prongs. The nose is long and so rounding at the end that the nostrils seem to lie almost underneath. Below the neck hangs a hairy, bell-like fold of skin which in old age forms a sort of pouch. Though the moose when brought to bay is a dangerous foe, it is capable of domestication and the young are readily tamed. See WAPITI; ELK.

Moose'head" Lake, the largest lake of the State of Maine, located on the border of Somerset and Piscataquis counties. It is about 35 m. long and varies in width from 1 to 10 m. Moosehead Lake receives the Moose River and drains into the Kennebec and the Penobscot. The surrounding country is a wild forest region in which game is still found. A railroad has been built along the southern shore of the lake.

Moose Jaw, a city of Canada in the Province of Saskatchewan, at the confluence of the Moose Jaw River and Thunder Bay Creek, on the Soo line and Outlook branches of the Canadian Pacific Railway, 400 m. w. of Winnipeg. The city is a railroad division point. There are large stockyards in the city and it is a stock-shipping center. The neighborhood supplies brick clay, gravel and coal. Among the leading buildings are churches, the Dominion Lands Office, the post office, a hospital and a custom-office. The leading industrial plants include grain elevators, flour, cereal, oatmeal, feed and chopping mills, electric-light, brick and cement-block plants, a brewery, a sash and door factory, machine shops and wholesale lumber establishments. Population in 1911, 13,823.

Moraine, *Mo rane'.* See GLACIER.

Moran', Thomas (1837-), an American etcher, illustrator and landscape painter, born at Bolton, England. He removed to the United States in 1844 and was educated in Philadelphia. He was apprenticed to a wood-engraver, then studied art under James Hamilton and, later, in Paris and Italy. Returning to the United States in 1871, he made sketches of scenes in the Yellowstone; the *Grand Cañon of the Yellowstone,* now in the Capitol at Washington, was produced from these sketches. Later expeditions in the West resulted in pictures of the chasm of the Colorado and the Mountain of the Holy Cross. His paintings are similar to those of the English painter Turner in their brilliance of coloring. Among his notable can-

vases are *The Conemaugh in Autumn, The Track of the Storm, After a Thaw* and *the Lost Arrow.*

Moravia, one of the provinces of Czecho-Slovakia, closely connected in history and ethnology with Bohemia on the west. It borders Silesia on the north, Slovakia on the east and Austria on the south. Its area is 8,578 sq. m., thus it is about the size of Massachusetts. The surface of the country is that of a plateau almost surrounded by mountains. The plateau itself is fertile. The principal agricultural products are rye, oats, barley, wheat, corn, flax, and sugar beets. Stock raising is carried on extensively. Among their industries the manufacture of woolen goods is prominent. The principal minerals are coal, lignite, graphite, and iron.

Ethnically, the Moravians belong to the western Slavs and are not distinct from the Czechs of Bohemia. In the ninth century, during the reign of Svatopluk, Moravia was a powerful country, and extended her sway over what is now Hungary, which empire they lost to the Magyars. Since 1029, Moravia has been generally united to Bohemia. Population about 3,600,000. (See CZECHO-SLOVAKIA.)

Mora'vians, the members of an evangelical Church which originated among the followers of John Huss, in Bohemia and Moravia. The denomination is also known as the Church of the United Brethren. The Moravians increased in numbers and strength during the Reformation period, in 1617 numbering about 200,000, but later persecutions greatly weakened them. Johann Amos Comenius, one of their early bishops, was instrumental in keeping alive the spirit of the Moravian movement. In 1722, some of those who had fled to Saxony to secure religious liberty began to build the town of Herrnhut, which became a center for Moravians. The organization of Brethren took a new under the leading bishop, Count Zinzendorf. John Wesley, the founder of Methodism, owed his initial inspiration to a band of Moravian emigrants, while on his way to America. The Moravians are especially active in foreign missionary enterprise, being the first Protestants to declare that the evangelization of the heathen was the duty of the Church as such. The Moravian Church now consists of four provinces —the German, the British and the American, North and South. The affairs of each province are administered by a synod, but the four are united in respect to doctrine, ritual, discipline and missionary endeavor. The Church has a complete ritual; its doctrines are similar to those of other evangelical bodies. The people are simple and earnest in the profession of their faith. In 1909 their world membership was 62,096. The Moravians of the United States numbered 26,373 in 1916.

Mor'dants, certain chemical substances employed in dyeing and calico printing for the purpose of fixing colors. The term is sometimes applied also to the material used to make gold leaf adhere in gilding. Among the most common mordants employed in dyeing textiles are the several salts of iron, aluminum sulphate and alum; and bichromate of potassium, all known as basic mordants, and used in the first part of the process of dyeing. Acid mordants, or those used in the last process, consist chiefly of tannic acid and the salts of sodium and of potassium dissolved in water. Mordants work on the principle of chemical action, combining with the dyestuffs used with them and forming a stable, permanent compound that holds or fixes the colors in the fibers. See DYEING.

More, Hannah (1745-1833), an English author, born at Stapleton. She became famous for her religious writings, her active work along the lines of charity and for her clever, witty verse and conversation. The popularity of her deeply moral and religious novels was extraordinary. She wrote *Sacred Dramas, Strictures on Female Education, Cœlebs in Search of a Wife, Christian Morals* and *The Shepherd of Salisbury Plain.*

More, Sir Thomas (1478-1535), an English author and statesman, born in London. In 1497 he went to Oxford, where he made the friendship of Erasmus, and he later applied himself to the study of law, entering Parliament in 1504. He opposed the grants of certain moneys to Henry VII, incurred that ruler's displeasure and soon left Parliament; but Henry VIII sent him on several missions abroad, and in 1514 he was made a privy councilor. Thus began his public life. When the Reformation was talked of in England, More supported Henry's defense of the Roman Catholic Church, and in 1529, when prosecution was opened against Wolsey, the King made More lord chancellor. Later Henry tried in vain to obtain More's authority for a divorce from Catharine of Aragon and a marriage with Anne Boleyn. When More refused, Henry's favor turned to fury. He had More committed to the Tower, where he subsequently refused to take an oath excluding Catharine's daughter from the throne and accepting Henry as head of the Church. Following an imprisonment of 13 months, More was brought to trial at Westminster, in May, 1535. He was convicted of high treason by perjury and injustice, and in July he was beheaded, to the consternation of all Europe, for his sweetness and blamelessness of his life, together with his learning and probity, made him then, as now, one of the most revered characters of history. More's important literary work, *Utopia,* is written in Latin. It is the conception of an ideal and imaginary commonwealth located in the Atlantic.

Mor'gan, Daniel (1736-1802), an American soldier, born of Welsh descent in Hunterdon County, N. J. He removed to Virginia in 1753, fought with Braddock, and at the opening of the Revolution was commissioned a captain of Virginia riflemen. He commanded at Quebec after Arnold was wounded. He was prominent in the Saratoga campaign and distinguished himself at the Cowpens. Previously he had risen to the rank of brigadier-general. In 1793 Morgan was made major-general of the Virginia militia, and in 1794 he commanded troops sent to suppress the Whiskey Insurrection. In 1797 he represented Virginia in Congress.

Morgan, John Hunt (1825-1864), an American soldier, born in Huntsville, Ala. In 1830 he settled near Lexington, Ky., with his parents. He served under Taylor in the Mexican War, and in 1861 he joined the Confederates. At Shiloh he commanded a squadron of cavalry; but his first notable exploit was his raid into Kentucky from eastern Tennessee in July, 1861, and his "Christmas Raid" of Kentucky the following year secured him promotion and a vote of thanks. In June, 1863, in an attempt to distract General Rosecrans from his advance into Tennessee, Morgan crossed the Ohio and pillaged Indiana and Ohio towns. But these states speedily arose and hemmed him in. While hurrying to join Lee in Pennsylvania, Morgan was obliged to surrender to General Shackelford on July 26, 1863. In November he escaped from the penitentiary at Columbus, Ohio, and with an independent following he later did effective work till defeated near Cynthiana, Ky. Then he fell back to Greenville, Tenn., where he was betrayed and shot on Sept. 4, 1864.

Morgan, John Pierpont (1837-1913), a noted American financier, born at Hartford, Conn., and educated at Boston and at the University of Göttingen. He began his business career in 1857, as a clerk in the house of Duncan, Sherman & Company, three years later becoming the United States agent for Peabody & Company. In 1869, while a member of the firm of Dabney, Morgan & Company, organized by himself to deal in investment securities, he began the long series of railway organizations that later made him famous. Between 1880 and 1900 Mr. Morgan's influence in financial matters assumed tremendous proportions. He saved from bankruptcy such railways as the Erie, the Reading, the Southern, the Northern Pacific

and the Lehigh Valley, and during the years of financial stringency between 1893 and 1897, when 500 banks closed their doors, he rehabilitated the credit of the United States. The period beginning in 1900 witnessed the reorganization of the steel industry, probably the most stupendous of Mr. Morgan's enterprises. Among other achievements of lasting importance, he used his power and influence to avert the financial panic of 1907. After his death, his services were thus summarized: "Perhaps no one man in the history of our finances has rehabilitated so much property threatened with ruin and financial extinction."

Mr. Morgan was also famous as a collector of art treasures and rare books. These are to be found in his own private library—one of New York's finest buildings—in the Metropolitan Museum and in many Europeans museums. Among the famous canvases he possessed are Gainsborough's *Duchess of Devonshire* and Hobbema's *Landscape.* Among his rare books are the Golden Gospels once owned by Henry VIII, two Mazarin Bibles, Shakespeare folios and quartos, and first editions or manuscripts of many literary masterpieces. He was also a generous helper of good causes; the New York Lying-In Hospital, the Harvard Medical School, the New York Trade Schools and the Cathedral of St. John the Divine are a few of the many institutions to which he has made liberal gifts. Personally he was a man of sterling character—just, upright, sincere and deeply religious.

Morgan, John Tyler (1824-1907), a political leader and United States senator, born at Athens, Tenn. While still a young lad his parents moved to Alabama, where he was educated for the law. He joined the Confederate army in 1861 as a private, being made colonel the following year and brigadier-general in 1863. In 1877 he was elected to the United States Senate and continued a member of that body for 30 years. During his long period of public service Senator Morgan was recognized as one of the ablest leaders of his party. A student of world politics, he became thoroughly versed in our relations with foreign nations. He was for years a member of the committee on foreign relations, and most of this time its chairman. He was a member of the commission to settle the Bering Sea fisheries dispute, and of the commission that formulated the laws and organized the Government of Hawaii.

Morgantown, W. Va., a city and the country seat of Monongalia Co., 102 m. s. of Pittsburgh, Pa., on the Monongahela River and on the Baltimore & Ohio, the Morgantown & Kingwood and other railroads. The river is navigable to Fairmont; from Morgantown to points on the river from 25 to 30 m. above the city there is considerable steamboat traffic. The region in which the city is situated abounds in natural resources. There are oil fields in the vicinity, extensive forests, rich deposits of coal, glass sand, clay, iron and limestone and good water power. In the town are several glass factories, manufacturing window glass, pressed prism glass, wire glass and mirrors; also foundries, brickworks, utility works, a publishing house and other establishments. A substantial trade is carried on in coal, coke, oil, live stock and manufactured articles. At Morgantown is located West Virginia University (See WEST VIRGINIA UNIVERSITY). The city has a fine courthouse and several other handsome buildings. The first settlement on the site was made in 1768 by David and Zackwill Morgan, in whose honor it was named. The place was incorporated as Morgan's Town in 1785. In 1905 it received its city charter. Population in 1920, U. S. Census, 12,127.

Morine, *Mo reen',* **Alfred Bishop** (1857-), a Canadian statesman, born in Nova Scotia and educated at Dalhousie University. He has practiced law at St. John's and in Toronto. As a young man he was correspondent at Ottawa for the Halifax *Herald* and the St. John's *Sun,* later successively editing the Halifax *New Era,* the Annapolis *Spectator,* the St. John's *Mercury*

and the St. John's *Herald*. In 1886 he entered Parliament as an Independent candidate, retaining his seat in the Newfoundland Assembly until 1906. Meanwhile, in 1894, he became colonial secretary; in 1897, receiver-general; and later, minister of marine and fisheries.

Mor'ley, John (1838-), an English statesman and author, born at Blackburn, England. He studied at Cheltenham and Oxford, and was later admitted to the bar. He began editorial work in 1867, being five years on the *Fortnightly Review*, three years on the *Pall Mall Gazette* and two years on *Macmillan's Magazine*. During the time he was editor of the last-named magazine he was also a member of Parliament. In 1886 he was made chief secretary of Ireland. In 1905 he became secretary of state in charge of the Indian Empire, a position which he filled with marked ability and great advantage both to India and Great Britain until his resignation, on account of advanced age, in 1910.

Mor'mons, a religious sect founded by Joseph Smith at Fayette, N. Y., in 1830. They are also known as the Church of Jesus Christ of Latter Day Saints. Smith claimed that he was visited by an angel as early as 1823 and again in 1827. On the latter occasion there was revealed to him the spot on what is now known as Mormon Hill, where the bible of the Western continent, the supplement of the New Testament, was buried. Following the angel's directions Smith found a book consisting of gold plates, bound together with gold rings. The writing was in an unknown letter and a strange language, but the Urim and Thummim accompanied the book, and as Smith ran these down the page the writing was transformed into English, which he read to amanuenses, who wrote the translation. This revelation was published in 1830 as *The Book of Mormon*. After the unsealed pages had been transcribed, the book was taken away by the angel. Oliver Cowdery, Martin Harris and David Whitmer united in an affidavit, which accompanied the preface, that an angel from heaven had shown them the plates from which the book was transcribed. Their testimony was supplemented by that of eight other witnesses who claimed that they had seen the book. Converts to the new sect were rapidly made and in a short time Smith had a substantial following.

In 1831 the Mormons moved to Kirtland, Ohio, where they expected to found a permanent community. A bank was started with Smith as president, a stone temple was built and a large area platted for a city. Here the organization of the Church was completed, Smith being the first president and head of the organization. Later 12 apostles and 70 elders were added. The practices and teachings of the sect soon led to their persecution by nonbelievers. The bank failed and the leaders of the organization were compelled to flee for safety. They went to Jackson County, Mo., where a colony had been started near Independence.

This colony increased rapidly, but soon came into conflict with the non-Mormons and the state authorities, and in 1838 the entire colony, numbering about 15,000, removed to Hancock County, Ill., where they founded the city of Nauvoo. Meanwhile Mormon missionaries had been active throughout the United States and Europe and converts continued to be added to their numbers. Smith secured from the state authorities a charter, which gave him almost absolute authority over Nauvoo and its inhabitants. Dissensions arose and Smith soon encountered opposition from some of his followers, as well as from the other citizens of the county. Another crisis was reached in 1843, when Smith and other leaders were accused of practicing polygamy. Doubtless the charge was without foundation, but a Mormon paper, the *Expositor*, denounced the Mormon officiary, and the editors were brought to trial and their printing plant was demolished. The state militia was ordered out to quell the disturbance. Smith and his brother Hyrum were arrested and lodged in jail in Carthage, the county

seat, where during the night they were shot to death by a mob on June 27, 1844.

Brigham Young succeeded Smith as president, and it was during his long regime that the Mormons were established in their new home and became a large and prosperous community, which developed into the Territory and later the State of Utah. A man of iron will, pursuasive eloquence and remarkable foresight, Young was one of the most astute leaders this country has produced. Under his leadership the colony emigrated to the borders of Great Salt Lake. Here by means of irrigation they transformed a barren desert into a fruitful valley. The journey was one of untold hardship and many perished on the way, but in the first ten years the new community became established on a permanent basis. They had considerable trouble with outside organizations, especially the United States Government, because of their practice of polygamy. Although Utah was organized as a territory in 1849 it was not admitted as a state until 1896, because of the Mormons' general belief in plural marriages. In 1882 Congress passed the Edmunds Law, which disfranchised all men living in polygamy, and in 1890 the president of the Mormon Church issued a decree forbidding plural marriages.

Some Mormons claim that the doctrine of polygamy was introduced by Joseph Smith, but others claim that it was introduced by Brigham Young after the colony reached Utah. The *Book of Mormon* contains a strong denunciation of polygamy, and its introduction caused a division in the church, those opposed to the practice forming the Reorganized Church of the Latter Day Saints. The Mormons believe in the Bible, supplemented by the *Book of Mormon,* which teaches the gift of revelation through the president of the Church, and that salvation can be attained only through redemption in Christ, repentance and baptism by divinely appointed apostles. In the United States the regular branch has about 350,000 communicants, and the Reorganized Church about 50,000. See SALT LAKE CITY; UTAH, subhead *History*; SMITH, JOSEPH; YOUNG, BRIGHAM.

Morn'ing-Glory, a twining or trailing vine of the Convolvulus Family, common along low fences and in yards, where it was once cultivated but has since run wild. The leaves have a variety of shapes, but are mostly pointed and heart-shaped. The flowers, which open either at sunrise or at sunset, but soon close, are of a variety of colors and are broadly trumpet-shaped, with darker stripes running from the tube to the margin. The morning-glory blooms through the entire summer and belongs to a genus closely allied to the less aristocratic bindweeds.

MORNING-GLORY

Morocco, *Mo rok' o,* an African empire occupying the northwest corner of the continent, touching the Atlantic Ocean, the Straits of Gibraltar and the Mediterranean on the w. and n., and surrounded by French territory upon the e. and s. Its area is estimated at 219,000 sq. m. The central portion is traversed by the great chains of the Atlas Mountains, whose rounded summits bear forests of valuable wood. The rivers at the north of the mountains are large and turbulent; those upon the south are sluggish and run dry in summer. There are few good harbors along the low unbroken coast; Tangier and Mogador are the best, and the little port of Agadir at the south might be made valuable.

Although Morocco has mineral and agricultural resources, they have been little developed. Copper, iron, antimony and lead lie unmined in the mountains,

and amethysts of value are known to exist in the hills. The natural vegetation of Morocco grows in abundance, indicating that agriculture might be practiced to advantage, but other than small fields of grains and some vegetables, little farm land is cultivated. The date is the principal article of food and is used in a variety of ways. The caring for herds and flocks is the chief pursuit, and the horses from Morocco are of world-wide fame. In the cities the manufacture of carpets, cloth, caps, especially the "fez," and metal ornaments is largely carried on.

The people of Morocco are of several distinct races. The Berbers and the Arabs predominate, while the Moors, a mixture of the two races, are next in numbers. There are many Jews in the cities, but the number of Europeans in the entire country is probably less than 4000. The country is governed by a despotic sultan, whose authority is absolute in religious and governmental affairs. His rule, however, is sometimes disputed by the Moors, and the aid of foreign countries is necessary to maintain peace. France claims the chief right to give its protection to the country. Morocco was known as Mauretania by the Romans, who controlled it until the fifth century, after which it was successively held by the Vandals, the Byzantines and the Saracens. During the domination of the latter in the Middle Ages, Morocco was the seat of Mohammedan learning. Spanish and French influence have long been rivals in Morocco, and when an agreement between Great Britain and France was entered into, whereby Great Britain gained complete control of Egypt and gave Morocco to the protection of France, Spain made serious objections, which finally resulted in the Treaty of Algeciras (Spain). This treaty did not, however, wholly settle differences. In 1912 Morocco became a French protectorate. The population is indefinitely estimated between 4,500,000 and 5,000,000.

Morocco, one of the capitals of the Sultanate of Morocco, situated on a fertile slope of the Great Atlas Range. The climate is healthful, but the buildings as well as the walls of the city are in a dilapidated condition, and the streets are ill kept, unpaved and irregular. There are several open market places and bazaars, 19 mosques and an imperial palace, which the sultan seldom visits. The manufacture of Morocco leather has declined in importance and the industries of the city are now of little value. Civil wars and rebellions have caused the former splendor of the city to vanish; in the 13th and the 14th centuries it was a famous Mohammedan center of learning, and its population was estimated at 700,000. The city was founded about 1072. Population, from 50,000 to 60,000.

Morocco, a superior, tough leather, made from skins of the goat, in the Levant, Spain and Belgium. It is tanned very carefully, dyed and grained, the art being derived from the Moors; hence the name of the leather. It is used in making fine shoes, for upholstering furniture and for binding books. Much of the so-called morocco is sheepskin, tanned and grained in imitation of the genuine article. See LEATHER.

Morpheus, *Mor' fus,* in classic myths the son of Somnus, the god of sleep. By the Romans he was considered the god of dreams, and was believed to have power to call up all sorts of human shapes and make them appear before the dreamer. He was the twin brother of Death.

Morphine, *Mor' fin,* an alkaloid found in opium. It is a white crystalline substance having a bitter taste, with narcotic properties, and except in very small doses is poisonous. It acts more quickly as a medicine than opium, and is usually administered by injection through the skin, where it is readily absorbed into the system, producing sleep. It is also a powerful emetic. The morphine habit tends to make one pale, dyspeptic and devoid of all moral responsibility. See OPIUM.

Morphology, *Mor fol' o jy,* the scientific study of the external and internal structure of plants and animals with re-

gard to their development, but without regard to their uses.

A study of the morphology of a plant lends added interest to botanical work, since it shows how the plant adopts the form best fitted to its needs. A close study of the arrangement of flowers shows that they are only specialized branches upon which the floral parts take the place of leaves. A sensible gradation from leaves to petals and sepals is shown in the wild painted-cup, whose leaves just underneath the flowers are as brightly colored as the flowers. The petals of the rose and of the water lily change, by a series of intermediate steps, into stamens. Even the pistil of a flower is shown to begin its development in a form exactly the same as that of a leaf. In botanical work morphology is often spoken of as structural botany.

Mor'rill, Justin Smith (1810-1898), a United States senator, born at Strafford, Vt. After a common school education he engaged in business, then in agriculture. He was a member of Congress from 1855 to 1867, when he became United States senator, serving in that capacity until his death. He was the author of the Morrill tariff bill of 1861, and of the bill establishing agricultural colleges and experiment stations. See AGRICULTURE; TARIFF.

Mor'ris, Gouverneur (1752-1816), an American statesman, born at Morrisania, N. Y. He graduated from King's College (now Columbia) in 1768, and was admitted to the bar in 1771. In 1776 he helped to draft the New York state constitution, and the following year he became a member of the Continental Congress, where he served until 1780. From 1781 to 1785 he assisted Robert Morris in connection with the financial affairs of the nation. In 1787 he was a member of the Federal Convention that drafted the Federal Constitution, assisting in the final revision of that document. President Washington appointed him minister to France in 1792, where he remained until 1794, after which he made an extended tour through Europe. He was in the United States Senate from 1800 to 1803. From 1810 until his death he was chairman of the commission which had charge of the Erie Canal, and was greatly interested in that enterprise.

Morris, Robert (1734-1806), a noted financier of the Revolutionary era, born in Liverpool, England. He came to America with his parents in 1747 and settled in Philadelphia. Here he soon secured a position as clerk, and afterward entered into partnership with his employer's son, maintaining the firm until 1793. At the beginning of the Revolution his firm was one of the largest and most prosperous in Philadelphia. Nevertheless, he cast in his lot with the patriot cause at the risk of great financial loss, and was of invaluable assistance in financing the Revolution. He opposed the Stamp Act in 1765, went as a delegate to the Continental Congress in 1775 and signed the Declaration of Independence in 1776. He gave the government the full benefit of his credit. Without his aid the campaign of 1781, resulting in the capture of Yorktown, would have been impossible. In 1781 he was unanimously elected superintendent of finance. He established the Bank of North America in 1781. In 1786 he served in the Pennsylvania Legislature and in the Federal Constitutional Convention the following year. He became a member of the first United States Senate under the new Constitution, serving until 1795. In the latter part of his life he failed in business, due to heavy speculations, and spent several years in a debtor's cell, but was released by the passage of the national bankruptcy law of 1802.

Morris, William (1834-1896), an English poet, artist and social reformer, born at Walthamstow, Essex, and educated at Oxford. Upon leaving college, he tried his hand at architecture and painting, until in 1861 he found his true calling. With Rossetti, Burne-Jones and other associates, he then founded a firm in London for the designing and manufacturing of artistic furniture, to which was later added wall paper, stained glass, tapestries and other textiles, dyeing, book

illumination and printing. In 1881 Morris moved his works to Merton, in Surrey, and in 1890 he founded the famous Kelmscott Press at Hammersmith. In the advancement of the lesser arts and for furthering the doctrine that all things should be made beautiful, he accomplished more than any other man of his time. As a poet, Morris retold classic and medieval stories in verse, infusing into his work a marked medieval tone and atmosphere. His collections of poems appear as *Defence of Guenevere, and Other Poems, Life and Death of Jason, The Earthly Paradise, The Story of Sigurd the Volsung and the Fall of the Niblungs* and translations of the *Æneid* and *Odyssey*. He wrote, besides, many romances in prose and verse, including *House of the Wolfings, The Roots of the Mountains, The Well at the World's End, The Story of the Glittering Plain* and *News from Nowhere*. In 1885 he became active as a socialist, lecturing to workingmen and supporting the movement with his pen.

Morristown, N. J., county seat of Morris Co., 30 m. n.e. of New York City and 16 m. w. of Newark, on the Whippany River and on the Delaware, Lackawanna & Western and the Morristown & Erie railroads. The town was settled about 1709 and called West Hanover, but the name was changed in 1740 in honor of Lewis Morris, then colonial governor of New Jersey. The city possesses considerable historic interest as having been twice the headquarters of the American army during the Revolutionary War. From January till May, 1777, and from December, 1779, to June, 1780, Morristown was the seat of Washington's headquarters. The Ford mansion which he occupied, and which has been purchased by the New Jersey State Historical Society, contains a fine collection of relics. Near the center of the town, now marked by a monument, is a steep eminence, the site of Ft. Nonsense, constructed by Washington.

Morristown's scenery and easy access to the near-by large cities make it a most desirable residence place. It is situated in an agricultural region and ships quantities of fruit, flowers and vegetables. At Morris Plains, four miles northeast, is a large state hospital for the insane. The shaft of the *Savannah*, the first steamboat to cross the Atlantic, was cast at the old Speedwell Iron Works. The city's chief manufactures are carriages and strawboard. Population in 1920, U. S. Census, 12,548.

Morse, Samuel Finley Breese (1791-1872), an American artist and inventor, born at Charlestown, Mass., and educated at Yale College. After graduation he spent some time in England studying painting with Allston and West. He returned to New York in 1815. In 1825 he organized the National Academy of Design and was the first president, holding the position for 16 years. In 1835 he became professor of the arts of design in the University of the City of New York. Previous to this, Morse had become interested in electromagnetism, and on his way home from Europe in 1832 he conceived the idea of the telegraph. Before he had been at the university a year he had a telegraph line half a mile long in successful operation. Having perfected his instruments, in 1837 he applied at Washington for a patent and to Congress for aid in the construction of an experimental line from Washington to Baltimore. But his invention was ridiculed and his application received little attention. He then went to Europe, hoping to interest foreign governments, but without success. Returning to the United States, Morse suffered four years of privation. Finally in 1843 Congress appropriated $30,000 for the construction of a telegraph line from Washington to Baltimore. The line was completed in 1844, and on May 24th the first message, "What hath God wrought?" was sent from the rooms of the Supreme Court in Washington to Baltimore. From that time the success of electromagnetic telegraph was assured.

Professor Morse laid the first submarine electric cable, which was located in New York Harbor, and he likewise

was the first to conceive the idea of the Atlantic cable. No other American inventor has received so many honors as were conferred upon Professor Morse. He received honorary degrees from numerous American universities and was awarded medals and badges of honor by many of the potentates of Europe. See TELEGRAPH.

Mortgage, *Mor' gaje,* the transfer of property, either real or personal, as security for the payment of a debt or the performance of a legal obligation. The debtor is called the mortgagor, the creditor, the mortgagee. The conveyance is absolute in form, but it is subject to a proviso by which it is to become void, or by which the pledge is to be reconveyed upon payment to the mortgagee of the debt with interest, at the expiration of the time specified. If this condition is not fulfilled the mortgagee gains absolute ownership at law, but by equity the mortgagor is allowed a limited time in which to redeem the property. In many states the mortgagee's common-law right to take possession by ejectment has been cut off, and he can secure possession of the mortgaged property only through foreclosure, a suit in equity in which he asks the court to deny the mortgagor further time in which to redeem the property. Mortgages can be sold to third parties and property under mortgage can also be sold. When real estate is sold before the mortgage is due the buyer assumes the mortgage and pays the seller the balance of the purchase price.

When several mortgages are given upon the same property they have priority in the order of their creation unless otherwise provided. Courts have always favored the mortgagor's right to redeem, and at any time before the extinction of the mortgage will allow him to compel a cancellation and surrender upon payment of the mortgage indebtedness, with interest, and as an incident to the redemption, will compel the mortgagee to account for any profits which he has received. If personal property or chattels are given as security the mortgage is known as a chattel mortgage. All mortgages must be recorded in the office of the recorder of the county in which the mortgage is given.

Mor'ton, Julius Sterling (1832-1902), secretary of agriculture under President Cleveland, born at Adams, N. Y. He graduated at the University of Michigan and studied law in New York City. Having moved to Nebraska, he was elected to the Territorial Legislature in 1856, became territorial secretary in 1858 and acting governor soon afterward. In 1893 he was appointed secretary of agriculture. He was the originator of Arbor Day.

Morton, Levi Parsons (1824-1920), an American financier and vice-president of the United States, born at Shoreham, Vt. He early became clerk in a country store, and his marked aptitude for business led to his rapid advancement. In 1854 he entered business in New York, and in 1863 founded a banking house there, and another one in London, the latter being the fiscal agent of the United States Government from 1873 to 1884. He served in Congress from 1878 to 1881; was minister to France from 1881 to 1885; was elected vice-president of the United States in 1888 and became governor of New York; in 1895. He exercised great influence upon the financial and political affairs of New York State and the nation.

Morton, Oliver Perry (1823-1877), an American statesman, born at Salisbury, Ind. At the age of 15 he was indentured to a hatter. After four years he entered Miami University, then studied law, and began practice in 1847. In 1852 he became circuit judge. He was active in the organization of the Republican Party. In 1860 he became lieutenant-governor of Indiana and succeeded to the governorship the next year. He filled this office throughout the Civil War and was most vigorous in his support of the Union cause, raising and equipping troops, and borrowing money when he could not get the Legislature to act, which sums the state later assumed. He was reelected governor in

1864, and in 1867 entered the United States Senate, where he remained until his death. Morton was an orator of great force, and an able executive.

Morton, William Thomas Green (1819-1868), an American dentist, the first to use ether as an anæsthetic, born in Massachusetts and educated in Baltimore. By experimenting on himself, he proved the safety of using ether, and first administered it in his practice in 1846. Dr. Morton patented his discovery in November, 1846; but for it he received no compensation, and Dr. Charles Jackson of England also claimed the discovery at the same time. Litigation to establish his rights to the discovery and patent ruined Dr. Morton financially and professionally.

Mosaic, *Mo za' ik,* the name given to the art of making designs in colored stones or glass by taking small pieces and fitting them together in cement, producing a pattern that becomes practically indestructible. This art was practiced extensively during the days of Rome's prosperity, in laying floors, walls and ceilings, and was revived under the Byzantine Empire, especially for churches. During the middle period of the 13th century it came again into Italy, where it has continued to be practiced. The shops connected with the Vatican employ constantly a number of workmen who are engaged in reproducing pictures of world-renowned artists in mosaic, using glass and artificial stones, prepared especially and tinted to suit the required shades. The Russians have become proficient in modern mosaic work. Florentine mosaic is employed chiefly in jewelry, personal ornaments and paper weights, and is composed of stones or shells in their natural colors cut in much larger pieces than Roman mosaics. The Americans have produced some of the finest designs in their public buildings, notably at Washington, D. C. The demand for mosaic work for floors, ceilings and walls in America continues to increase, and, no doubt, as the skill becomes greater the art will be brought to perfection.

Mosby, *Moze' by,* **John Singleton** (1833-1916), an American Confederate soldier, born in Powhatan County, Va. He studied at the University of Virginia, but was dismissed for shooting and wounding a fellow student. He was admitted to the bar and practiced law in Bristol, Va. In 1861 he entered the Confederate army under Joseph E. Johnston. During most of the war, however, he served at the head of a guerilla band of partisan rangers that harassed the Union troops by devastating raids. President Hayes appointed him consul at Hongkong in 1878, where he remained for six years. Later he settled in Washington, where he engaged in government work. He published a volume of *War Reminiscences.*

Moscow, *Mos' ko,* one of the most important cities of Russia, the principal town of the government of the same name, situated on both banks of the Moskva River, 400 m. by rail s.e. of St. Petersburg. Covering an area of about 40 sq. m., the suburbs inclusive, the city presents a varied appearance, with its busy squares of traffic, manufacturing quarters, the adjoining villages and the homes with the spacious courtyards where live the nobility. The Kremlin, an old fort surrounded by a wall having 19 towers and five gates, includes many sacred buildings, chief of which are the Uspenskiy Cathedral, containing holy and venerated pictures, relics of saints and the throne of Vladimir I. Various old cathedrals, churches, monasteries and convents are also found near by. Other buildings of prominence are the palace of the czars, built of white stone with a gilded cupola, the senate house, the arsenal, the university founded in 1755, museums, a picture gallery and several libraries.

Moscow is the chief manufacturing city of the country, employing nearly 50,000 laborers in the textile industries, of which calico printing is the principal one, and fully as many more in the other mills and factories. The city also contains factories for preparing foodstuffs, and chemical, metal and metallurgical

works. Commercially Moscow has been of great importance since the 14th century. Here is carried on an extensive traffic in hemp, oils, grain, sugar, wool, metals, skins, tallow, timber, silk and raw cotton.

The first mention of Moscow is in 1147, though a settlement on the site dates back to a remoter antiquity. In 1703 the young Peter the Great, meeting with violent opposition to his plans, removed to St. Petersburg to found there a new capital. Napoleon occupied the Kremlin in 1812, and repeated attempts to remove him resulted in a burning of the city through carelessness of the inhabitants, and a general pillaging of all quarters by the French. Population in 1919, including the suburbs, estimated at 2,000,000.

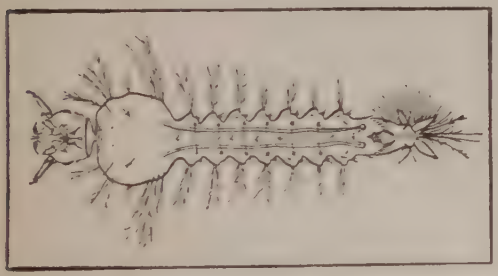
Mo'ses, the great Hebrew lawgiver, prophet and leader, born in Egypt, when the Israelites were in bondage to the Egyptians. He was the son of Amram and Jochebed. When he was three months old his mother put the child in a basket made of bulrushes and left him on the river bank, trying thus to save him from the cruel edict of Pharaoh, that every male child of the Hebrews should be slain at birth. He was found here by a daughter of the King, who adopted him, named him Moses and had him educated. After he had grown to manhood, having incurred the anger of Pharaoh, he fled to the land of Midian, married there the daughter of Jethro, a priest, and settled down to the life of a shepherd. It was at this period of his career that Moses heard the call of Jehovah to deliver the Israelites from their bondage, and in due time he returned to Egypt to fulfill his mission. He was now 80 years of age. It was only after the land had been visited by ten horrible plagues that Pharaoh permitted the Children of Israel, under the leadership of Moses, to depart, and he afterwards pursued them with his army to the Red Sea, over which the Israelites passed as on dry land. The strong east wind which divided the waters for the Hebrews, however, did not aid the pursuers, who were all drowned when the waters came together. The 15th chapter of *Exodus* contains the beautiful song of Moses and his sister Miriam, their offering of praise for the deliverance of the people.

Moses was now confronted by the tremendous problem of guiding the host of the Israelites through the wilderness to the Promised Land of Canaan. Not only did he take them to the borders of that country, but he gave them their institutions, both political and religious. While they were encamped on Mt. Sinai he announced to them the Ten Commandments, the basis of Israelitish law. The people were 40 years in the wilderness, but it was the successor of Moses, Joshua, who led them finally into Canaan, for Moses was not permitted to enter therein because of his lack of faith when the people murmured for water in the Desert of Zin (*Num. xx*). When his work was finished he ascended Mt. Pisgah, overlooking the new country his people were to inhabit, and there he died, at the age of 120 years. The Bible records in simple and beautiful language his burial in an unknown grave in the land of Moab.

Mosquito, *Mos ke' to,* an annoying and dangerous insect of the Gnat Family and a member of the same order as the flies. It is a small two-winged insect, with segmented abdomen and long, slender legs. The male is easily distinguished by the presence of two or four plumelike antennæ. The female is larger, has one pair of threadlike antennæ and is our chief source of annoyance, for she it is that bears the sting. The eggs of the mosquito are laid in raftlike colonies upon the surface of standing water, and there, in about 16 hours, they hatch into lively, wriggling larvæ, which issue from the underside of the egg mass and seem never quiet. In this state they are known as wrigglers, and may be found in almost any bit of standing water, from that in a vase of flowers in the house, or the discarded cans in the rubbish heap, to the ponds of roadside and woods.

MOSQUITO

The wriggler has a large head, swollen thorax and slender abdomen. The body is edged with stiff bristles and the filaments about the mouth are in constant vibration. Peculiarly enough the breathing tube extends from the posterior extremity of the body, and it is nearly as thick as the body itself. When its air supply is exhausted, the wriggler ascends by means of a series of rapid jerks, and thrusts its breathing tube above the surface, holding its body at an angle of about 45°. After filling its air sacs, it withdraws the tube and descends by the same curious, jerky movement. After about seven days of existence, the larva is transformed into a peculiar, big-headed pupa, lighter than water, so that it must exert violent muscular action in order to sink beneath the surface. It is, however, as active in this state as in the larval form, and its only means of defense against its numerous enemies is its quickness. Two days suffice to bring the pupa to maturity, and then it loses its aquatic habits and becomes the familiar mosquito. A period of cold weather lengthens the pupal



MOSQUITO LARVA

stage, but under ordinary conditions ten or twelve generations of mosquitoes may hatch in a single season.

The proboscis of the mosquito is a fine, needlelike sword, borne only by the female, who is notoriously bloodthirsty. She pierces the flesh to a blood vessel and draws blood therefrom until her abdomen is distended almost to bursting. Contrary to popular belief, however, she does not gorge herself until death ends her feast, but lives to enjoy many another banquet at our expense. The poison of the bite is the effect of a liquid which is probably injected to hasten the flow of the blood. Many persons become so inoculated against this poison that the bite of a mosquito produces no swelling whatever.

DISEASE BEARING MOSQUITO

The common mosquitoes belong to the genus Culex, of which there are several species, all comparatively harmless. Very different, however, are the species of Anopheles, which carry malaria and yellow fever germs and, in consequence, should be recognized and exterminated. The adult may be distinguished from its harmless cousin by the position of the body when at rest; that of the Anopheles is held at an angle of from 20° to 45°, while the body of the Culex is practically horizontal, and its head is held so low that it has a humpbacked appearance. The life of an Anopheles from egg through adult is about 16 days.

In 1882 it was suggested by Dr. King of Washington that the Anopheles mosquito might be the carrier of malarial germs. His theory was not conclusively proven until some years later, when investigators in various parts of the world almost simultaneously demonstrated the fact beyond doubt. The malarial parasite is a Protozoan, that is, an animal and not a plant, which lives and grows in the red corpuscles of the human blood. Here, as it matures, spores are formed which continue to grow and form new germs, or die and are eaten by the white corpuscles unless the blood is too badly diseased. If blood containing these parasites is removed from the human body, the germs at once begin a new develop-

ment, which is carried out to its full extent only in the stomach of the Anopheles mosquito. Here they form large cells, known as zygotes, which burst and set free numberless active, spindle-shaped cells that penetrate the walls of the salivary and poison glands, and are thus ready to be injected into the body of the next victim of the mosquito's lust for blood.

In its larval stage the mosquito is rather easily destroyed. A coating of oil over any body of water prevents the wriggler from protruding its breathing tube, and without this means of procuring air it is soon suffocated. Any small receptacles of standing water should be emptied, cisterns and rain barrels should be covered, and all ponds or even mud puddles of long standing should be treated with kerosene. The oil may be applied by pouring or by spraying, and only a thin film is necessary if it is spread evenly. Burning pyrethrum powder in a room kills or stupefies all insects; after which they should be swept up and burned. Many localities in the United States have entirely rid themselves of these pests by vigilant treatment, and there is no reason why the death-bringing mosquito, along with the equally harmful fly, should not be exterminated.

Mosquito Territory, or **Mosquito Reserve,** a coastal region of Nicaragua bordering upon the Caribbean Sea. It has been set apart for the Mosquito, or Misskito, Indians by the governments of the United States, Great Britain and Nicaragua, but became voluntarily a part of Nicaragua in 1894. The soil is rich and watered by many rivers, chief among which is one called the Rio Grande. Mahogany, dyewoods and drugs are the most valuable exports. The climate is moist and not healthful. Bluefields, or Blewfields, in the southeastern part, is the most important town of the Reserve.

Moss, a name applied to a large class of flowerless plants, allied to the liverworts and, with them, technically known as Bryophytes. The mosses are so different in external appearance and habits and so unlike in name in diverse localities, that they are often hard to identify. In general they are green-stemmed plants, bearing tiny leaflike structures which conceal at their bases little, swollen stalks, carrying the spores that take the place of seeds. Their life history presents a manner of growth known to botanists as alternation of generations, which means that the plant lives in at least two forms, each of which produces, not its own form of life, but the other. The spores, which form upon the leafy stalks, fall to the ground and germinate, putting forth long, matted branches in the soil or in decaying logs of moist, shaded woodlands. In time these stems develop buds which grow out into the air in leafy plants with rootlike attachment to the soil. This is the first part of the life of the moss plant. Later the leafy stalks produce two kinds of organisms which act very much like the stamens and pistil of flowering plants. One bears a second form of spore, which, falling upon the pistil-like organ, causes it to develop a box whose lid breaks open disclosing spores of the first sort mentioned. This is the second generation of the plant.

The mosses are decorative, and their thickly growing stems of light green, dark green or gray, carpet decaying woods, rocks and unsightly pondsides until they are rendered softly beautiful. Moss leaflets have great absorbing power and are capable of holding so much water that it can be wrung from them as from sponges; thus they can stand great drought, and their stems may dry until, if touched, they fall in powder, and yet, if moistened, will return to their former activity.

Mosses are of great economic use in preparing the soil for the growth of other plants, as they not only form a bedding in which other seeds may take root, but the acid formed in their roots helps to wear away rocks. Sphagnum moss produces the great peat beds, a source of fuel; others are used for bedding and packing material; and some are

sources of dyes, mucilage and certain medicines.

Our commonest mosses are known by various names; probably pixie-cup, haircap, canary, and hanging mosses are the most familiar, and any shaded grove is apt to present several forms of these.

CECROPIA MOTH

Moth, one of the three general divisions of the order Lepidoptera, the other two being the skippers and the butterflies. Moths, or millers, as they are frequently termed, generally fly by night and are attracted by lights, often to their own destruction. They may be distinguished from the butterflies, which fly by day, by their antennæ, which, though various in form, are generally threadlike and are never terminated by a knob. The wings, when spread, are horizontal rather than at an angle with the body, and when at rest are either folded about the body or left outspread. The moths include six families of the order, and many are harmful to vegetation and to woolens. Others are carnivorous and seek the tinier insects that cross their path; still others feed only upon honey and the sweet sap of trees. Their appetites vary greatly, according to their stage of development. See CATERPILLAR; LEPIDOPTERA; HAWK MOTH; DEATH'S-HEAD MOTH; CODLING MOTH.

HONEY-FEEDING MOTH

Mother Carey's, *Ka' riz,* Chicken. See PET'REL, subhead *Stormy Petrel.*

Mother-of-Pearl, the brilliant, iridescent, sheenlike material which certain Mollusks, particularly those of the Oyster Family, produce in hard layers in the interior of their shells. The colors are usually a creamy white, variegated with purple, azure and pink. Mother-of-pearl is used in the arts quite extensively, particularly in making buttons and knife handles, and also in the ornamentation of papier-mâché work, lacquer ware, etc., by inlaying the articles with fragments of shells containing this beautiful material. See PEARL.

Mothers, the National Congress of, an organization founded in Washington, D. C., in 1897, by Mrs. Theodore W. Birney and Mrs. Phoebe W. Hearst. The chief objects of the organization are: to raise the standards of home life; to give young people the opportunity of learning how to care for children; to bring the home and school into closer relationship; to further in every way the various agencies that work for developing good citizens and to secure more adequate laws for the care of dependent children. Among the various departments of the organization are those of education, children's literature, child hygiene, Juvenile Court and probation, child labor, parent-teacher associations, child welfare legislation, playgrounds and home economics. Annual meetings are held in large cities of the United States, and since the founding of the society two International Congresses on Child Welfare have been convened, in 1905 and 1911 respectively. Every person interested in promoting the welfare of children is eligible to membership. The headquarters of the association are in Washington, D. C.

Mo'tion, Laws of, the three general principles in accordance with which all the phenomena of motion take place. They were first clearly stated by Sir Isaac Newton in 1686.

FIRST LAW. *A Body at rest continues at rest unless acted on by some external*

force and a body in motion continues in motion with uniform speed in a straight line unless acted on by some external force. Thus a moving railroad train, when the power of the engine is shut off, continues to move until the external forces of friction bring it to a stop; if there were no friction, it would continue to move at the same speed as before. When moving at a constant speed, the entire force exerted by the engine is just enough to overcome the retarding forces of friction.

Second Law. *Change of momentum of a body is proportional to the force acting and to the time during which it acts, and this change of motion (more accurately, momentum) takes place in the same direction as the force causing it.* Momentum is the product of the mass (commonly, but incorrectly, called weight) of a body by its velocity. If one pushes for a few seconds a heavy wagon on a smooth pavement, the velocity produced is small. The same force applied for the same length of time to a light wagon would produce a greater velocity. The momentum produced in the heavy wagon, the product of its large mass by its small velocity, is equal to the momentum produced in the light wagon, the product of a smaller mass by a greater velocity. If the force is exerted for a greater length of time, a proportionately greater momentum will be produced in each case. Again, when a ball is thrown horizontally, it is continually pulled out of a straight line by the force of gravity, and its change of motion takes place in the direction gravity acts, that is, downward.

Third Law. *To every action there is an equal and opposite reaction.* If a freely suspended gun be fired, the expanding powder gases push back on the gun as hard as they push forward on the bullet, and it will be found that the gun and the bullet have acquired equal (and oppositely directed) momenta.

Mot'ley, John Lothrop (1814-1877), an American historian, born at Dorchester, Mass., and educated at Harvard University and at Göttingen and Berlin. Later he traveled in southern Europe. Returning to America, he studied law and in 1837 was admitted to the bar. His preference, however, was for literature, and his first publication, barring contributions to magazines, was a novel entitled *Morton's Hope.* This had slight success, as did its successor, *Merry-Mount.* He was ambassador to Vienna from 1861 to 1867, and minister to London from 1869 to 1870. Motley is noted chiefly for his *Rise of the Dutch Republic,* which he published in 1856 and which was translated into French, Dutch and German, securing him high honors in Europe and America; and for *History of the United Netherlands* and *The Life of John Barneveld.* The latter was published in 1874. Motley takes rank with the most eminent of American historians. His work is characterized by vividness, and shows an intense love for the spirit of liberty.

Motor Cycle, a self-propelling bicycle. In general plan the motor cycle closely resembles the bicycle, but it is made heavier to sustain the weight of the motor and the strain caused by the speed at which it can be driven. The motor is a gasoline engine usually of three-horsepower. The controlling apparatus is attached to the handle bars, and a brake enables the operator to stop the motor cycle almost instantly. Many motor cycles have two seats arranged tandem. The motor cycle is a practical road machine, and on good roads will easily carry two passengers from 80 to 100 m. a day. Some patterns are built for racing, and under favorable circumstances a speed of 100 m. an hour has been attained with them for distances.

Mo'tor Generator, *Jen' er a" tor,* a combined electric motor and dynamo. In its simplest form for direct-current work it consists of two armatures mounted on the same shaft and revolving in separate magnetic fields. The motor armature and the fields receive current at one voltage and the dynamo armature delivers current (and sometimes excites its own field) at a very different voltage from that of the sup-

ply. Such machines are used when it is desired to get very heavy currents at a low potential, five to ten volts, for electroplating or other special work, from a source of current at 110 or 220 volts.

The machine is frequently made with two armature windings on the same core and revolving in a common magnetic field, the shaft, of course, carrying two commutators, one for each armature winding, as for the separate armatures. Such a machine, because of its simpler construction, is less expensive and more efficient than one of the type first described, but it is not capable of regulation of the voltage of the dynamo side.

ROTARY CONVERTER. This differs from the preceding machine in having one of its armature windings designed for alternating current and connected to collector rings instead of a commutator. Such a machine can be used for converting alternating current into direct current or the reverse; hence the name rotary converter. Machines of this type are widely used in electric-power transmission systems. The electric power is carried long distances in the form of alternating current at high potential, 13,000 to 60,000 volts, to the substation where it is transformed to alternating current at a moderate potential, 350 to 500 volts. It is then led into the alternating-current side of the rotary converter, and direct current at a potential of 500 to 600 volts is delivered from the direct-current side of the converter. In this case the magnetic field is excited by direct current from the direct-current side of the converter. The direct current delivered is led to the local-distributing system, as the trolley and rails of a street railway, or to wire for supplying direct current for various other purposes. See DYNAMO; ELECTRIC MOTOR; ELECTRIC RAILWAY.

Mott, John R. (1865-), Christian leader, lecturer and author, born at Livingston Manor, N. Y. Mr. Mott graduated from Cornell University in 1888, since which time he has been student secretary of the International Y. M. C. A. and also chairman of the executive committee of the Student Volunteer Movement. Since 1895 he has been general secretary of the World's Christian Student Federation, and since 1898, foreign secretary of the International Committee of the Y. M. C. A. Since 1901 he has been associate general secretary of the International Committee of the Y. M. C. A., and in 1910 he was the presiding leader of the World's Missionary Movement in Edinburgh. Mr. Mott is a man of remarkable executive ability and of most marvelous power as a leader of men. He has been recognized by various institutions of learning, receiving numerous honorary degrees. He is a member of the Phi Beta Kappa and a fellow of the Royal Geographical Society. In conferring the degree of doctor of laws upon Mr. Mott, Princeton characterized him as "a new crusader bent on the Christian conquest of the world."

Moulton, *Mol' tun,* **Ellen Louise** (1835-1908), an American poet, born in Pomfret, Conn. She studied at Troy, N. Y., edited and published works before she was 20, and in 1855 married William Moulton, a Boston journalist and publisher. Her works include *Juno Clifford, a Tale; Bedtime Stories, Random Rambles, Stories Told by Twilight* and *At the Wind's Will.*

Moultrie, *Mol' try,* **William** (1731-1805), an American soldier, born in Charleston, S. C. He was the son of a physician and received an ordinary education. He fought against the Cherokee Indians and, though bound by many ties to the Loyalists, he espoused the cause of the colonists. In 1775 he sat in the first South Carolina Provincial Congress and also commanded a regiment of state militia. In March, 1776, he defended Charleston against Clinton, and he was thanked by Congress for repulsing the British fleet under Parker. Moreover, the fort of palmetto logs, which he had thrown up on Sullivan's Island for the protection of the city, was named for him. In September of the same year he became brigadier-gen-

eral, and was given command of the departments of Georgia and South Carolina. He actively defended this territory, finally entering Charleston, where he commanded until the arrival of General Lincoln. He was taken prisoner at the capitulation of the city, 1780; but with several others was exchanged for Burgoyne in February, 1782. In October following he was commissioned a major-general. He was governor of South Carolina in 1785 and again in 1794.

Mound Bird. See BRUSH TURKEY.

Mound Builders, the name given to a race which once inhabited the Western Hemisphere. Their name refers to the immense mounds which they built as fortifications, memorials or burial places. Thousands of these mounds are found in the valleys of the Mississippi and Ohio rivers, and upon being opened are found to contain bones, trinkets and other remains of an ancient civilization. The mounds differ greatly in shape and many are seen to bear a rude resemblance to animals, human figures and geometrical designs. The "Serpent Mound" of Ohio is probably the best known; it is 1300 ft. in length and has serpentlike curves, head and tail. In the open mouth is a circular mound supposed to represent a serpent's egg. It is a disputed question whether or not the Indians are descendants of the mound builders.

Moundsville, W. Va., a city and the county seat of Marshall Co., 11 m. s. of Wheeling, on the Ohio River and on the Baltimore & Ohio Railroad. The city occupies a point of land about a mile in width at the junction of the Big and Little Grave creeks. The chief factory products are glass, enameled ware, brick, lumber products, leather, flour, feed, foundry products and grain cradles. Here is located the state penitentiary. A fine courthouse is one of the attractions of the city. The most distinctive feature of Moundsville, however, is a giant earth mound in the vicinity, 70 ft. in height and 320 ft. in diameter at the base, one of the largest monuments of the American mound builders, whence the city's name (See MOUND BUILDERS). The first settlement here, which was called Elizabethtown, was made in 1798. It was incorporated in 1830. In 1831 the town of Moundsville was laid out about one-half mile distant (incorporated in 1832). In 1866 the two towns were consolidated and called Moundsville. Population in 1920, U. S. Census, 10,669.

Mountain Ash, or Rowan, *Ro' an,* **Tree,** a beautiful tree of the Rose Family, well known throughout Europe and America. It is a trim, stately tree with crisp, green leaves, made up of many finely-toothed leaflets, and clusters of many white flowers. The branches are slender and, near the leaves, are reddish-brown in color. The fruit is a cluster of bright red berries, beautiful to the sight but bitter to the taste. These berries remain on the tree until well along in the winter, and when capped with snow have a picturesque appearance. The American mountain ash grows wild in Northern woods, and there may be either a low shrub or a slender tree. Farther south it is found often under cultivation. In the British Isles it is called the rowan tree, and many quaint superstitions center about it.

Mountain Cork, a variety of asbestos obtained from Sall Mountain, Georgia. It has the elasticity of cork, and is usually white or grayish-white in color. See ASBESTOS.

Mountain Laurel. See KALMIA.

Mountain Lion. See PUMA.

Mount Carmel, Pa., a city of Northumberland Co., 45 m. n.e. of Harrisburg and 6 m. e. of Shamokin, on the Northern Central, the Philadelphia & Reading and the Lehigh Valley railroads. It is situated in a mountainous region in the midst of valuable coal fields, and near by are extensive anthracite mines. The manufactures include flour, lumber, mining implements, miners' lamps, men's clothing and all kinds of miners' supplies. Population in 1920, 17,469.

Mount Clemens, Mich., a city and the county seat of Macomb Co., 22 m. n.e. of Detroit at the head of navigation on

the Clinton River, about 5 m. from its entrance into Lake St. Clair, and on the Grand Trunk and other railroads. Electric lines connect the city with all near-by towns. The city has manufactories of beet sugar, wagons, carriages, sleighs, caskets, agricultural implements and cooperage products. The place is beautifully situated and is noted for its medicinal mineral waters, which are used in the treatment of various diseases. Large sanatoriums, bathing houses and hotels have been built to accommodate the thousands of annual visitors. The city has a Chamber of Commerce and a public library. Settled in 1802, it was first incorporated in 1878. Population in 1920, 9,488.

Mount Holyoke, *Hole' yoke,* **College.** See WOMEN, COLLEGES FOR.

Mount Stephen, Sir George Stephen (1829-), a capitalist, born in Banffshire, Scotland, and educated at Aberdeen University. In 1850 he came to Canada, where he later entered largely into manufacturing woolen goods, became president of the Bank of Montreal, joined the railroad syndicate that eventually controlled all the traffic of the Canadian Northwest, and associated himself with the company that in 1880 undertook to construct the Canadian Pacific. In 1891 he was raised to the peerage, with the title of Lord Mount Stephen. This name was taken from the peak named for him, on the Canadian Pacific, of which he was president. Previously, in 1888, he had returned to England to live.

Mount Ver'non, the home and burial place of George Washington, in Fairfax County, Va., 15 m. s. of Washington, D. C. When Washington's elder brother, Lawrence, acquired the estate, he called it Mt. Vernon in honor of Admiral Vernon, under whom he had served in the British navy. The Washington mansion, situated on a high bluff overlooking the Potomac, was built by him in 1743. It is of wood, two stories high, 96 ft. long by 32 ft. deep, with a high piazza extending across the front. In 1752, at the death of his brother, the estate came into possession of George Washington. The house and 200 acres surrounding it were purchased in 1859 by the Mt. Vernon Ladies' Association, which had it restored, as nearly as possible, to what it was in Washington's time. The six rooms on the ground floor, in one of which Washington died, contain many articles of historical interest; in the garden are trees planted by Washington's hand, and in the coachhouse may be seen his carriage. Near by is the simple brick tomb to which, in 1831, his body was removed from the old family vault. Here, behind an iron grating, may be seen the sarcophagi containing the remains of George and of Martha Washington.

Mount Vernon, Ill., a city and county seat of Jefferson Co., 76 m. s.e. of St. Louis, Mo., and about 115 m. s.e. of Springfield, on the Wabash, the Chicago & Eastern Illinois, the Louisville & Nashville and other railroads. The chief industries are farming and coal mining. Among the manufactured products are railroad cars, axe handles, flour, lumber and machinery supplies. The town contains a tie-preserving plant, a large grain elevator, marble works and a Supreme Court Building. Settled about 1819, it was incorporated in 1872. Population in 1920, U. S. Census, 9,815.

Mount Vernon, N. Y., a city of Westchester Co., 13 m. from the Grand Central Station in New York, on the Bronx River and Eastchester Creek, an arm of Long Island Sound, and on the Harlem Division of the New York Central & Hudson River, the New York, New Haven & Hartford and the New York, Westchester & Boston railroads. Electric railways connect the city with New Rochelle, Yonkers, New York and the intervening towns and cities. Mount Vernon is primarily a residential suburb of New York. Chester Hill, in the northeastern section, contains many costly residences. The streets and boulevards are broad and well kept and the sweep of lawn and garden makes the city most attractive. The elevated portions command wide views of Long Is-

land Sound. Mount Vernon contains a city hospital, a public library, fine school buildings and 37 churches. There are about 50 varied industries. Mount Vernon was founded in 1851 by a number of realty companies. The place was incorporated as a village in 1853 and chartered as a city in 1892. Population in 1920, U. S. Census, 42,726.

Mount Vernon, Ohio, a city and county seat of Knox Co., 45 m. n.e. of Columbus and 85 m. s.w. of Cleveland, on the Kokosing River and on the Cleveland, Akron & Columbus and the Baltimore & Ohio railroads. It is situated in a fertile agricultural region and near the natural gas and oil belt. The river affords ample water power for manufacturing purposes. The city has considerable trade in farm and dairy products. The principal industrial establishments include the extensive plant of the Corliss engine works, locomotive shops, foundries, lumber and flour mills, cooperage works, sash and blind shops, bridge and bent-wood works, sawmills and furniture factories. The city contains a public library, good schools and municipal buildings, and Hiawatha Park, with a picturesque lake. Population in 1920, U. S. Census, 9,237.

Mourning Dove, or **Turtle Dove,** a bird of the Pigeon Family. It is larger than the robin (13 inches) and is grayish-brown above, with part of the wings black-spotted; the under parts are pinkish-brown; the tail feathers are lead-colored with a black band across the middle, and all but the two middle feathers are white-tipped. There is a black spot below each ear and an iridescent spot on the side of the neck. The nest is simply a platform of twigs placed on a branch from 10 to 50 ft. above the ground or occasionally placed on the ground. Two white eggs are laid. The mourning dove ranges throughout North America from British Columbia to Panama. It is common in orchards, fields and along railroads, and in the fall collects in flocks of considerable size.

Mouse, the name of a genus of Rodents of the Rat Family best known through its representative the house mouse. It has smooth fur which is generally dark-colored, a long, hairless tail, pointed ears and bright, beady eyes. It is very destructive and is hard to exterminate, since it is shy and works only by night. It gnaws its way through partitions and runs up vertical walls to secure food, which it locates by means of its keen scent. The field mouse and harvest mouse are other specimens of the same genus which live in the field and make their homes in small burrows in meadow or cornfield in the winter, or swing their nests from the top of cornstalks in the summer. Members of these classes are easily tamed, and some domesticated species are sold as pets.

The jumping mouse, or kangaroo rat, is a member of the Jerboa Family.

Mouth, the opening into the alimentary canal. It is bounded in front by the lips, on the sides by the cheeks, below by the tongue and above by the palate. The hard palate forms the roof of the mouth and also the partition between the mouth and the nose. Back of the hard palate is the soft palate. The mouth is connected with the pharynx by the passage known as the isthmus of the fauces, on each side of which are the tonsils.

Moving Pictures, pictures produced by an instrument which projects in rapid succession, views of successive phases of a moving object so as to represent action in real life. The projecting apparatus is a form of stereopticon, originally called the cinematograph, and having a strong objective or projecting lens and a reel on which the film containing the pictures is wound. A strong, steady light is necessary to the production of clear pictures.

The photographs are taken by a camera made especially for this purpose. The camera has a reel for holding a sensitized film, similar to that on the projecting instrument. The camera is set so as to cover the field in which the object moves. Then the sensitized film passes across the lens, stopping for a fraction of a second, while the shutter opens and closes for the exposure, the

photograph being instantaneous, when the film is moved forward for the next exposure. So rapidly is this done that several exposures can be made in a second. When the picture is completed, the ribbon of film is developed, and from the negatives thus formed positives are made on another ribbon of the same size. This ribbon forms what is called the "film." The pictures on this film are passed across the field of the projecting lantern in the same order and with practically the same speed with which the ribbon on which the negatives were taken was passed through the camera. The result is the reproduction of the scene in a remarkably lifelike manner.

For an hour's exhibition 50,000 to 165,000 pictures are required. The pictures ordinarily produced are in black and white. Those in colors are painted by hand, which is tedious and expensive. Attempts have been made to use color photography, but so far without practical results. Moving, living or animated pictures of such objects as automobiles racing, an express train at full speed, horses and fire apparatus going to fires and soldiers marching are presented with marvelous accuracy. The cinematograph combined with the phonograph for giving the representation of songs and dances furnishes an interesting entertainment. Owing to the great inflammability of the celluloid film, great precautions must be taken in operating the cinematograph so as not to bring the film too near the light and set it on fire.

Thomas A. Edison has invented an apparatus which he calls the kinetophone, which is a talking moving-picture machine. By means of the kinetophone the sounds which one would expect to accompany the actions are heard. Men speak, dogs bark, musicians play upon the instruments. The sounds are articulate but somewhat metallic. This apparatus consists of a combination of the phonograph and the cinematograph, the instruments being so adjusted that they work in harmony.

Moving pictures are of great educational and commercial value. In the best-equipped schools they are now used in teaching geography and history and for illustrating the methods of manufacture employed in some of our great industries. Commercially they constitute a valuable advertising device. It is estimated that over $500,000 is paid daily in the United States to see moving-picture shows. The industry represents an investment of over $2,000,000,000, and each day over 5,000,000 people attend these shows. More than five miles of film are produced daily to meet the demands of exhibitors.

Mowing Machine, a machine for cutting grass. It consists of a frame, drive wheels, gearing, cutting apparatus and attachments for hauling the machine. A toothed wheel is attached to the shaft, to which the drive wheels are also attached. This wheel meshes into a small one at right angles to it and attached to a shaft, at the opposite end of which is a pitman, which gives a reciprocating motion to the knives. These are triangular pieces of steel, with opposite sides sharpened. They are attached to a horizontal steel bar and move in slots in fingerlike guards. As the machine is drawn forward, the knives are given a rapid motion, and cut the grass as it is forced up against the guards. The ordinary mowing machine is hauled by two horses and cuts a swath about four feet wide. See REAPING MACHINE.

Mozambique, *Mo" zam beek'*, **Channel,** a passage between the eastern coast of Africa and the Island of Madagascar. It is over 1000 m. long, and its breadth varies from 250 to 600 m. The Comoro Islands are in its northern part.

Mo'zart, Wolfgang Amadeus (1756-1791), the celebrated German composer, was born at Salzburg, the son of a violinist of high repute. He was educated with great care, and in early childhood displayed a precocity beyond anything that had ever been known. With his sister, who was five years his senior, he was taken when six years of age to the Austrian court, where his performances excited wonder. The follow-

ing year he published several sonatas and other works, and in 1764 went to England, and was enthusiastically received. When only 13 years old he was made master of concerts of the court orchestra of Salzburg, and the next year his father took him to Italy for further study. During this sojourn he accomplished a marvelous feat in transcribing from memory some difficult music of the Sistine Chapel, Rome, after a single hearing. The Pope decorated him with the Order of the Golden Spur, and he was admitted to membership in the Philharmonic Academy of Bologna, in spite of the rule denying membership to candidates under 20 years of age.

From this time Mozart produced sonatas, symphonies, concertos, masses, with astonishing rapidity. In 1781 he removed to Vienna. While at the Austrian capital some of his greatest masterpieces were written, among them the opera *Idomeneo,* which placed him among the greatest musicians of the world. Many honors were at this time conferred upon him, and the King of Prussia allowed him a comfortable yearly income. In 1782 he was married to Constance Weber, a great-niece of the composer Weber. During the years that followed the most of his operas were written.

Mozart was a man of stupendous intellect, sound scholarship and a wealth of musical ideas. His melodies flowed from an exhaustless fountain; the more he gave, the more inventive he became. And in every period of his development his works were marked by an originality and fluency that give to this composer a unique place among the half dozen supreme geniuses of his profession. The following are among his greatest works: *Mithridates, The Clemency of Titus, The Marriage of Figaro, The Magic Flute, Don Giovanni* and the famous *Requiem Mass.*

Mucilage, *Mu' si laje,* a solution of the gum of certain plants in water. When gum arabic is dissolved in hot water, a paste is formed which can be kept from molding by the addition of a few drops of carbolic acid. This is an excellent mucilage and can be easily made by any one. See GUM ARABIC.

Mud Hen. See COOT.

Mud Puppy, or **Hellbender,** an American lake salamander of the Proteid Family. It differs from other salamanders in retaining through life the gills of its larva stage, thus being more nearly related to the fishes than are other Amphibians. The mud puppy is dark brown in color, often marked with lighter spots. It is sometimes called mud eel or water dog.

Mug'wump", an Indian word signifying one of superior wisdom or of exaggerated importance. In 1884 the term was applied in derision to those members of the Republican Party who refused to vote for James G. Blaine for president. Those to whom the term was applied adopted it as a mark of honor, and later it was applied to those who did not hesitate to vote independently.

Muhlenberg, *Mu' len burg,* **Frederick Augustus Conrad** (1750-1801), an American politician, son of Heinrich Muhlenberg, founder of Lutheranism in America. He was born in Montgomery County, Pa., and studied in Germany, then became pastor of an influential Lutheran church in New York City. In 1776 he returned to Pennsylvania, where he entered actively into Revolutionary movements. He belonged to the Pennsylvania Assembly, was president of the convention that ratified the Federal Constitution and was speaker of the first House of Representatives. As chairman of the committee of the whole, his casting vote carried Jay's Treaty.

Muir, *Mure,* **John** (1838-1914), an American geologist, explorer and naturalist, born in Dunbar, Scotland, and educated in Scotland and at the University of Wisconsin. He discovered the Muir Glacier, Alaska, visited the Arctic on the *Corwin* in search of the De Long expedition, and actively engaged in the cause of forest preservation and the establishment of national reservations and parks. Muir traveled throughout the world. He was a prolific writer and the Editor of *Picturesque California.*

Muir Glacier, one of the largest glaciers of Alaska, named for its discoverer, John Muir. It is situated on the west coast of Alaska at the head of Glacier Bay, upon which it has practically a three-mile frontage. It covers an area of 350 sq. m. and drains an area estimated to be more than 800 sq. m. in extent. The front takes the form of a vertical, overhanging cliff, from which icebergs are constantly falling into the sea. See GLACIER.

Mukden, *Mook" den',* a town of China, capital of Manchuria, situated on the Hunho, about 400 n.e. of Peking. Within the second wall of the city stands the palace roofed with yellow tiles. Here also are the government offices and other prominent buildings; and tombs of the early rulers of the city rise to the east. During the Russo-Japanese War Mukden was the scene of some important engagements (See RUSSO-JAPANESE WAR). Population, 250,000.

Mul'berry, the name of a number of trees and shrubs of the Mulberry Family, valuable as shade and fruit trees; one species, the white mulberry, is raised abundantly for its leaves, which form the chief food of silkworms. The mulberry is widely distributed in warm or temperate climates, and two species are

MULBERRY

A. Branch and Fruit. B. Flower enlarged. C. Fruit.

native in the United States. The tree has a short trunk, with wrinkled bark; the foliage is thick, and, as the tree grows rapidly, lawns set out to mulberries are soon well shaded. The shiny, light green leaves are slightly lobed, and are sharply-toothed at the margins. The flowers are rather fragrant but inconspicuous, and are followed by a sweet, red or purple, compound fruit, somewhat resembling the blackberry. The mulberry is often planted in fruit-growing districts, where its fruit, not so highly prized as the raspberry and blackberry, serves as a decoy to the birds.

Mule. See Ass.

Mullein, *Mul' in,* a common weed of the roadside and rocky hills, belonging to the Figwort Family. The first year it presents only a circle of thick, woolly leaves, which lie close to the ground in a flat rosette. The leaves are light green and so closely covered with fine hairs that they present a silvery-white appearance, especially when touched with moisture. Its flatness and the bitterness of its juice prevent this plant from being trampled down or eaten by cattle; hence its commonness in fields. Its woolliness renders it hardy far north. The second year the mullein sends up a long, leafy stalk, sometimes six or eight feet in height and densely set with pale yellow, irregular flowers, which open a few at a time, those at the base blooming first. The base leaves are long and clasp the stalk; nearer the flower spike, the leaves are shorter and narrower. The flowers are followed in the fall by globular, brownish seed pods.

MULLEIN

Like most weeds the mullein was brought here from the Old World for medicinal purposes, and because of its hardiness it has become a common weed. A variety of white mullein, with an unwinged stem, is found in waste places only; and a moth mullein, with smooth stem growing only from two to three feet in height and bearing its flowers in clusters, is another roadside variety.

Mul'let, a large family of fish all of which are considered excellent food. The members of the family are chiefly recognized by peculiarities of their skeletons and by a gizzardlike stomach, which seems to have developed because of the mud-dwelling tendencies of this fish. All are stout, about two feet in length, with large scales and a slaty-blue coloration. Most of them are marine fish dwelling in the bays of Atlantic and Pacific coasts of both continents. They feed by filtering the vegetable matter from the rich mud and expelling the sand and other unused portions from their mouths. The smallest mullets are called the whirligig mullets from their habit of whirling rapidly near the surface of the water. The mullet which was enjoyed by the epicures of ancient Rome is a member of the Perch Family, and is still sold in London markets.

Mu'lock, Dinah Maria. See CRAIK, DINAH MARIA.

Mulock, Sir William (1843-), a Canadian statesman, born in Ontario and educated at Toronto University and the Royal Military School. He practiced law in Toronto, examined in and lectured on equity for the Upper Canadian Law Society, and from 1882 to 1905 sat as a Liberal in the House of Commons, where he was actively interested in all legislation pertaining to agriculture, banking and commerce. Meanwhile, in 1896, he entered the Laurier cabinet as postmaster-general, in which capacity he was responsible for the establishment of a three-cent Canadian postage rate from Canada to all sections of the empire and for the adoption of the penny postage within the empire. At the same time he wiped out the deficit in his department and secured a surplus. While postmaster-general he also established the department of labor, of which he became the first minister, and in October, 1905, he became the first chief justice of the exchequer division of the Ontario High Court of Justice. To Sir William is due the establishing of direct steam communication between Canada and South Africa.

Mum'my, an embalmed human body, preserved after the manner of Egyptian embalming. The Egyptians exercised great care in regard to preservation of the dead. The process of embalming took 70 days, the body being soaked for that period of time in preservative solutions and then swathed in linen bandages, sometimes of 20 thicknesses. A great number of Egyptian mummies in excellent state of preservation have been found. They are of light weight and are yellowish in color.

Mumps, a contagious disease, common among children. It takes the form of inflammation of the salivary and parotid glands and causes swelling in the face and neck. The disorder occurs usually in cold, damp weather. It may affect only one side of the face, or both. Preliminary symptoms are soreness in the jaw and earache. No specific treatment is necessary. The system should be kept in generally good condition otherwise, and great care exercised for some time after the disappearance of the swelling to prevent the patient from taking cold, as serious brain troubles have been known to result from want of such precautionary measures at this time.

Münchhausen, *Munk' how" zen,* **Hieronymus Karl Friedrich,** BARON (1720-1797), a German soldier, born in Bodenwerder. He was possessed of a daring spirit of adventure and a boundless imagination, and the exaggerated accounts which he gave of his own bravado in the Turkish campaign of 1737-39 were rendered with a calm and a methodical lying, the most unique in the history of literature. Rudolph Erich Raspe gathered his marvelous tales into an Eng-

lish edition in 1785. Of Münchhausen himself, whose name has grown proverbial half the world over, it is said that his imagination outlived his memory, and that during his old age he believed more firmly than did any one else in these wonderful inventions of his own mind.

Muncie, *Mun' sy,* **Ind.,** a city and county seat of Delaware Co., 54 m. n.e. of Indianapolis, on the West Branch of the White River and on the Cleveland, Cincinnati, Chicago & St. Louis, the Lake Erie & Western, the Chicago, Cincinnati & Louisville, the Central Indiana, the Chicago, Indiana & Eastern and other railroads. The city has iron and steel works, machine shops, canneries, paper and pulp mills, glass factories, steam-boiler and iron-bedstead works and manufactories of silver plate, lawn mowers, agricultural implements, wagons and carriages, gas engines and gas fixtures, men's clothing, knit underwear, caskets and undertakers' supplies, fruit jars and novelty wares. There is a large trade in the various manufactured articles, coal, farm products and live stock. There are also railroad repair shops. Muncie is the seat of the Eastern Indiana Normal School. Here are a fine public library and city hospital. Population in 1920, 36,524.

Mun'goos. See ICHNEUMON.

Munich, *Mu' nik,* (Ger. München), a city of Germany, the capital of Bavaria and the third largest town of the country. It is frequently called the most uniformly beautiful city in Europe. Two of the finest streets are the Maximilianstrasse and the Ludwigstrasse, in which are some of the most important edifices. Among the buildings are the royal palace, Hoftheater, the court church, the town hall, the new palace of justice, the old Pinakothek, or art gallery, the new Pinakothek, the Glyptothek, which is a building containing a series of valuable ancient and modern sculptures, the Schack Gallery, the Industrial Art Building, the Bavarian National Museum, the royal library and the university. The Hofgarten, the English garden and the cemeteries are imposing and beautiful. A large number of statues adorn the city, and Munich, preeminently æsthetic, is the leading school of painting. The industrial development is inferior, but the principal manufactures are musical, astronomical, mathematical and surgical instruments, leather, jewelry and glass. Beer constitutes the chief export. Glass staining, wood carving and bronze founding represent the handicrafts. King Louis I did much to further the magnificent growth of the city. Population 596,467.

Municipal, *Mu nis' i pal,* **Government,** the government of a city, town, village or other minor civil division of a state. It is most often applied to the administration of the affairs of a city, and if such government is a failure the state is endangered, both because the cities have such a large proportion of the population, and because the character of the whole country is so largely influenced by city conditions. Municipal government as now organized in the United States and, in fact, throughout the world, is administered by a mayor and common council through various executive boards. The mayor is elected usually by the people but often by the council. He is the head of the executive department and has the appointment of a large number of officials. In the hands of the council are most of the legislative functions, though the mayor usually has veto power over its measures. The judicial officers of the municipality are merely agents of the state, although there are local justices for the purpose of trying petty offenders without delay. Other duties of city governments are to be seen in the laying out of new streets and in enforcing building regulations. Usually the expense is assessed upon the property benefited and the city is reimbursed in part. The care of bridges and streets is everywhere a municipal function, and lighting and transportation, as well as waterworks, are among the principal objects of the care of municipalities.

There is, however, what is known as a "municipal problem," involving the

question of maintaining honesty and efficiency in municipal affairs. Numerous policies have been suggested as a means of reform, among them being proportional representation, direct legislation, ballot reform, nominations by the people, the organization of local political parties and restriction of suffrage to taxpayers. Municipal ownership and operation of such public utilities as waterworks, street-car lines and lighting are common in Europe, and gaining ground in the United States. See COMMISSION FORM OF GOVERNMENT; MUNICIPAL OWNERSHIP.

Municipal Ownership, a general term for the ownership of anything by a municipality. The name is specifically applied to the ownership, by a city, of such public utilities as waterworks, street railways and lighting plants, and usually implies municipal operation as well as ownership. The necessity of providing adequately for the ever-increasing needs of cities in water, light and transportation has led to the belief on the part of many that all public utilities should be controlled by the people and not by private corporations. To insure the required grade of supply and operation, and to guard against excessive charges, it is necessary that the municipality shall either own the public enterprises or regulate them in the hands of private operators. The proper scope of municipal ownership is still a subject of debate. The nearest approach, however, to a general agreement is that it may embrace all those services which are largely of a sanitary character, like water supply and sewerage, and that it should be restricted to quasi-public industries in which private competition is uncertain. Another point agreed upon is that municipal ownership should not be carried so far as to increase municipal debts beyond reasonable limits.

The present status of municipal ownership in the United States is that a large percentage of the waterworks, including nearly all of the larger ones, are owned by the cities which they supply; while next in order come electric-lighting plants. Few gas works and practically no street railways are owned by American cities, though such ownership is common in Great Britain. With the exception of sewerage systems, which rarely yield a revenue, waterworks are the most common form of ownership, but the control of telephones, docks and wharves and public markets is now being generally considered as rightfully belonging to the scope of municipal enterprises.

Munkácsy, *Moon' ka che,* **Mihály** (1844-1900), a Hungarian painter, whose real name was Michael Leo Lieb. His treatment of dramatic themes was broad and powerful, and he had a great vogue in his day. His most representative canvases are *Milton Dictating "Paradise Lost" to His Daughters, Christ before Pilate* and *Golgotha.*

Munroe, *Mun ro',* **Kirk,** (1850-), an American writer, born near Prairie du Chien, Wis. He studied civil engineering at Harvard, and while on the road, employed by the Northern and Southern Pacific railways, he accumulated varied material, which he later used in his stories for boys. After being the first editor of *Harper's Round Table,* from 1879 to 1882, he removed to Florida, upon his marriage with a daughter of Amelia Barr. He has written *The Flamingo Feather, The Fur Seal's Tooth, At War with Pontiac, With Crockett and Bowie, Under the Great Bear, For the Mikado* and *The Belt of Seven Totems.*

Mu'ral Circle, a graduated circle mounted for meridian measurements. The circle is usually made of brass, having an axis exactly at right angles to its plane, pointing due east and west, and connected with a telescope. The circle and telescope are firmly mounted on stone piers for observing and measuring objects in the celestial meridian alone. The graduation of the circle is as nearly perfect as it can possibly be made, and is carried to so fine a fraction that a microscope is often used to read it. It is also called meridian circle. See ALTITUDE; AZIMUTH.

Murchison, *Mur' chi sun,* **Sir Roderick Impey** (1792-1871), a British geologist, born in Tarradale, Scotland, and educated at a military school. He entered the army but became interested in scientific studies through the influence of Sir Humphry Davy, and soon gained a reputation as a geologist. He made a thorough survey of England and Wales and reclassified the geological systems, being the first to give the Silurian system distinct recognition. He then made a survey of Russia under the patronage of Nicholas. Murchison was the author of numerous works on geology, among them being *The Silurian System* and *The Geological Structure of the Northern and Central Regions of Russia in Europe.*

Mur'der, "the offense of unlawfully killing a human being with malice aforethought, expressed or implied." In the United States murder committed intentionally is called murder in the first degree, and in most states it is a capital offense. The time elapsing between the decision to commit the act and its execution is not considered as a factor in determining the degree of the murder. The act may follow the decision instantly or at the end of an extended period. If another than the person intended becomes a victim of the murderer, the degree of the crime is the same; that is, if A intends to shoot B but shoots C instead, he is adjudged to have committed murder in the first degree. An idiot, an insane person, and a child too young to possess discretion cannot in the eye of the law commit murder. Manslaughter differs from murder in the first degree in that the act was not intentional but due to gross carelessness or neglect, or to an accident which in the opinion of the court might have been prevented. It is usually punished by imprisonment.

Mur'free, Mary Noailles (1850-), an American writer, whose novels appear under her pen name, Charles Egbert Craddock. She was born in Murfreesboro, Tenn. Deprived of the customary activity of childhood by lameness, from an early age she devoted herself to the study of the people of the Tennessee mountains, where she passed her summers. Her novels, the first of which appeared in 1884, portray with fidelity and charm the life and scenery of the mountains. Her writings include *In the Tennessee Mountains, The Prophet of the Great Smoky Mountain, In the "Stranger-People's" Country, The Young Mountaineers, A Spectre of Power* and *The Fair Mississippian.*

Murfreesboro, *Mur' freez bur o,* or **Stone River, Battle of,** a severe engagement of the Civil War, fought Dec. 31, 1862, and Jan. 2, 1863, near Murfreesboro, on the Stone River, Tenn. Forty-one thousand Federals of Rosecrans's army moved from Nashville against Murfreesboro, where Bragg and 38,000 men had taken up winter quarters, and on Dec. 30 the two armies were within cannon shot of each other. Rosecrans's plans for the following day were prevented by Bragg, who took the initiative and made such a vigorous assault upon the Union right wing that it would have been annihilated save for the work of Thomas. By nightfall, however, honors were evenly divided, and the next day the armies rested. On Jan. 2 the Federal batteries opened so murderous a fire that 2000 Confederates fell in 20 minutes; the Union troops gained a slight advantage, and before the morning of Jan. 4 Bragg and his men had stolen away. The Federals lost about 13,000 men; the Confederates, nearly 12,000.

Mu"riat'ic Acid, or **Hy"drochlo'ric Acid,** a colorless gas having a sharp, penetrating odor capable of producing extreme irritation of the membranes of the nose and throat. It is a compound of hydrogen and chlorine and may be prepared by burning a hydrogen flame in an atmosphere of chlorine gas. Hydrochloric acid is easily dissolved in water, and in that condition is commonly known. It has been liquefied under the pressure of 40 atmospheres at a temperature of 10°C., but the liquid is less active than the solution of the gas in water.

Commercial hydrochloric acid is prepared on a large scale by the action of

sulphuric acid upon salt. The salt and acid are heated in large iron vats, and the gas produced is passed into towers filled with coke, through which water is constantly oozing. The gas is entirely dissolved by the time it reaches the base of the tower. Commercial hydrochloric acid is generally slightly yellow in color, owing to the presence of iron as an impurity. It is used in the arts and in the manufacture of glue and some medicines.

Muril'lo, Bartolomé Esteban (1618-1682), a famous Spanish painter, born at Seville. In 1642 he visited Madrid and sought the aid of Velásquez, then at the height of his power, through whose influence Murillo was permitted to copy the masterpieces in the Royal Gallery. He returned to Seville in 1645 and executed a series of sacred pictures for the Franciscan convent, which brought him fame. In 1648 he married a wealthy lady of noble rank, and their house became a meeting place for artists and connoisseurs. Murillo founded the Academy of Arts at Seville in 1660, and was its first president.

Murillo's right to fame rests upon his ability to give depth and atmosphere to groups of figures and to put into them warm and transparent color. His subjects were of a religious nature, and in these pictures he sometimes gave oversentimental expression, and was more truthful in representing the ordinary and natural than in introducing a lofty type of intellectual or ideal beauty. There are many specimens of his work in Spain and in other parts of Europe. His most splendid works were executed for the Hospital de la Caridad, and they include *Moses Striking the Rock, Return of the Prodigal, Abraham receiving the Three Angels* and the *Miracle of the Loaves and Fishes.*

Mur'ray, Sir John (1841-1914), a distinguished scientist, born in Ontario, Canada, and educated in Victoria and Edinburgh universities. In 1868 he visited Spitzbergen and the Arctic on board a whaler, from 1872 to 1876 he explored on the *Challenger* the physical and biological conditions of the great ocean basins, and he subsequently took part in the explorations of the *Triton* and the *Knight Errant* and visited the oceanic islands of the tropics. Later Sir John was engaged in a bathymetrical physical and biological survey of the fresh-water lakes of the United Kingdom. Besides editing the report of the expedition of the *Challenger* in 50 volumes, he had written extensively on scientific subjects. He was associated with a great number of British and foreign scientific bodies and also received honors from many others.

Murray, John Clark (1836-), a writer on philosophy and ethics, born at Paisley, Scotland, and educated at the universities of Glasgow, Edinburgh, Heidelberg and Göttingen. In 1862 he removed to Canada to accept the position of professor of mental and moral philosophy in Queen's University, Kingston. In 1892 he took the same chair in McGill University, becoming professor emeritus in 1903. Besides numerous contributions to periodicals, he has written, among other books, *A Hand-book of Psychology, An Introduction to Ethics, An Introduction to Psychology* and *Memoir of David Murray.*

Murray River, the chief river of Australia, formed by many streams flowing down the western slopes of the Australian Alps and uniting in a large stream that winds its tortuous way to the sea by means of Lake Alexandrina not far from the city of Adelaide in South Australia. The Murray is important for its fisheries and for its navigation, because, though it is too shallow to receive large vessels, the smaller ones form a means of transportation between the many cities along its course. The Darling River, a northern stream, is the chief tributary.

Muscatine, *Mus" ka teen',* **Iowa,** a city and the county seat of Muscatine Co., 25 m. s.w. of Davenport and 14 m. e. of Des Moines, on the Mississippi River and on the Chicago, Milwaukee & St. Paul, the Chicago, Rock Island & Pacific, the Iowa Central and other railroads. Muscatine is the center of the vast pearl-button industry of this part of

the Mississippi Valley, the buttons being made from river mussel shells. In the vicinity are deposits of coal, and on Muscatine Island, a short distance below the city, large quantities of watermelons are grown. Dairying and truck farming are among the chief industries of the surrounding agricultural district, one of the principal crops being potatoes. A large trade is carried on in lumber, fruit and hogs. There is considerable forested land in the neighborhood. The manufactures include buttons, boxes, tile, brick, wagons, carriages, packing cases, pottery, flour, oatmeal and pickles. Important industrial establishments are foundries and machine shops, rolling mills, canning factories, lead works and lumber mills. Situated upon high rocky bluffs, the city offers a fine view of the river. Its chief features are Musser Library, a public park, a soldiers' monument and a highway bridge across the river. On the site of an old trading post the place was settled in 1833, and in 1839 incorporated as Bloomington; in 1851 it was chartered and renamed. Population in 1920, U. S. Census, 16,068.

Muscles, *Mus' 'lz,* the masses of tissue of the animal body which form the organs of motion. They are the fleshy or meaty portion of the body covering its framework and giving to it its shape and about one-half of its weight. They may be classified according to their structure as striped, or striated, and unstriated. All are composed of small cells, or fibers, arranged in bundles and held together by an adhesive substance and interspersed with blood and lymph vessels, which convey nourishment and carry off waste material; and by nerves which stimulate their activity. The peculiar properties of muscles are contractility, or power to contract, when stimulated to action by nerves, by heat or electricity, or when acted upon by mechanical agents; elasticity, or power to expand and stretch after contraction; tonicity, or the slight tension which is their normal condition in repose.

The striped muscles are voluntary; that is, under the control of the will. They are composed of slender, muscular fibers, each about an inch in length and $\frac{1}{500}$ of an inch across. Each fiber is enclosed in a very delicate, but tough and elastic, sheath called the sarcolemma, and shows alternate light and dark transverse bands or stripes. The whole muscle is enclosed in a sheath called the perimysium, and is penetrated by nerves from the cerebrospinal column. The voluntary muscles are such as are found in the biceps of the arm; the great pectoral muscle, which draws the arm in front of the chest; the sartorius muscle, which assists in the bending of the knee; the extensor muscles, which extend or straighten the leg; the masseter muscles, the chief muscles of mastication, elevating the lower jaw by their contraction; and those occurring in other parts of the body.

The typical form of voluntary muscle is a rounded body, tapering at both ends and terminating in tendons, by means of which they are attached to the skeletal bones (See TENDONS). A beautiful example of the peculiar value of the terminations of muscles in tendons is seen on the back of the hand, across which the tendons pass like wires from the end joints of the fingers to the muscles above the wrist, which control those extremities. The tendons are inelastic and communicate muscular movement direct. At the wrist they are held in place by a band of ligament. This arrangement gives grace and beauty, as well as dexterity, where a continuation of muscle would make the hand bulky and clumsy and render it unfit for the work it now performs. The muscle may be attached to two or more points. The point remaining stationary during muscular activity is called the origin, and the point yielding to muscular contraction is known as the point of insertion. The origin of the biceps muscle of the arm is at the shoulder; its point of insertion is in the forearm just below the elbow.

In unstriated, or involuntary, muscle the fibers appears as long, slender, flat cells, tapering at both ends. They are shorter than the fibers of the voluntary

muscles and are slower in their movements. These muscles constitute a large part of the walls of the alimentary canal, blood vessels and intestinal tract. They are not controlled by the will, but carry on their functions automatically under the stimulation of the nerves from the sympathetic, or ganglionic, nervous system. These muscles are usually attached to the softer parts of the body and are without extended tendons.

Intermediate between the striated, voluntary muscles and those of the unstriated, involuntary variety is the cardiac muscle of the heart, which is both striped and involuntary. It is composed of short, cylindrical cells arranged like beads on a string, lying also in bundles. It is remarkable for its rhythmic contractions, which pump the blood from the heart to all parts of the body at regular intervals. See HEART.

Nearly all muscles are arranged in pairs, the contraction of one causing a certain movement, the contraction of the other restoring the part moved to its original position; one set of muscles opens the eye, those in opposition close it. The extent or limit of the action of a muscle depends upon the length of its fibers; the degree of force which it is capable of exerting is determined by the number of its fibers. The voluntary muscles are capable of a high degree of education. See NERVOUS SYSTEM.

Muses, *Mu' zez,* in Greek myths, nine daughters of Jupiter and Mnemosyne (Memory). Each presided over some special branch of literature, music or the liberal arts and sciences. Clio was Muse of history; Calliope, of epic poetry; Euterpe, of lyric poetry; Melpomene, of tragedy; Terpsichore, of the dance; Erato, of love poetry; Polyhymnia, of sacred poetry; Urania, of astronomy; and Thalia, of comedy.

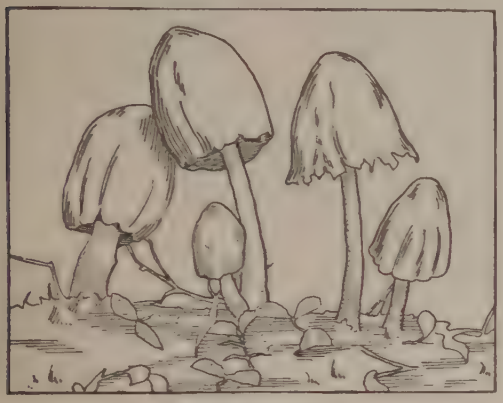
Museum, *Mu ze' um,* an institution for the collection, exhibition and study of works of art, historic relics and objects of nature. The word comes from the Temple of the Muses, which was a place of study. Public museums are the outgrowth of private collections usually made by sovereigns, who in time threw them open to the people. Museums of art are often known as art galleries; others are classified according to the nature of their collections, as museums of natural history, museums of anthropology and geological museums. With the exception of Turkey all European countries have museums, and they are found in nearly all cities. The British Museum is the greatest in the world; next in importance is the Louvre in Paris. Others of note in Europe are the Luxembourg, chiefly devoted to paintings; the royal museums of Berlin, Dresden and Munich; and the museum in the Vatican in Rome. See BRITISH MUSEUM; LOUVRE, PALACE OF THE; VATICAN.

The leading museums in the United States are the National Museum at Washington; the Peabody Museum at Cambridge, Mass.; the Museum of Natural History, Boston; the Boston Art Museum; the American Museum, New York; the Field Columbian Museum, Chicago; the Free Museum, Philadelphia; the Carnegie Museum, Pittsburgh; the Golden Gate Museum, San Francisco; and the City Museum, Milwaukee. The leading museums of Canada are that of Laval University, Quebec; the Château Ramesey, Montreal; and the museum of the University of Toronto. See NATIONAL MUSEUM OF THE UNITED STATES; SMITHSONIAN INSTITUTION.

Mush'rooms, a group of widely-known fungi, growing on decaying animal or vegetable matter or in the rich mold of dark, moist forests. They are flowerless plants and reproduce by tiny spores which take the place of seeds. These spores falling upon the ground in warm, moist situations, where there is plenty of nourishment, absorb food, become swollen and divide. The divisions swell and they in turn divide until there are long chains of white or grayish threadlike tissues known collectively as mycelium. These become matted at some points and send up little spherical heads, called buttons, which are usually white. As the button expands, the veil, which covers it, breaks and discloses an

umbrellalike growth, divided into cap and stem; the remains of the ruptured veil upon the stem is called the annulus.

Other mushrooms are wholly surrounded by an enveloping membrane, called the volva, which, though it becomes broken as the plant expands, may be seen in little fragments upon the cap or in a cup at the base of the stem. Such a cup is called the "death cup," not



MUSHROOMS

because all mushrooms which have it are poisonous, but because all poisonous mushrooms do have it. The caps of different mushrooms differ in their manner of bearing spores. Some produce them upon gills, thin, platelike strips which radiate from the stem to the edge of the cap on the underside; some in pores, and others upon spines. If the cap of the mushroom is carefully removed and placed upon white or colored paper, a spore print, or circle of the fallen spores, lying just as they drop from the cap, may be secured. Mushrooms are classified according to the color of these spores, and according to their consistency, some being waxy and others dry and dustlike.

There is a common custom of speaking of this fungus as if there were two classes, toadstools and mushrooms, the former being poisonous and the latter not. This is only custom, however, for technically all are mushrooms and are poisonous mushrooms or edible mushrooms. Probably the name toadstools arose from their habitual growth in damp and darksome situations, also the rendezvous of toads. No hard and fast rule can be given for distinguishing edible from poisonous mushrooms. Those that are at all old, those that have the death cup, and buttons too young to be classified should be avoided, and probably none should be eaten unless passed upon by an expert. The most common edible varieties are the meadow mushrooms, coral mushrooms, morels and the honey mushrooms. The most frequently occurring poisonous species are those of the amanita group, having sticky red or yellow caps.

Mushrooms may be parasites, growing on living plants, or saprophytes, growing upon dead ones. When growing upon a tree they frequently cause its death by producing a white rot of the tissues. Since the spores generally gain entrance through wounds, their growth can be hindered by painting all bruises with tar. The fairy-ring mushrooms are saprophytes and grow in yearly widening circles in yards or meadows. It was once believed that these circles of mushrooms enclosed the space in which fairies held their nightly revels, and the sudden disappearance of the plants meant that the fairies had been in some manner displeased and so left that spot in anger. Scientists, less poetical, claim that the mycelium exhausts the food in the soil within the circle so that only those spores which fall outside develop; thus the circle widens. At last when the mycelium has spread thickly without as well as within, none of the spores develops and in a single night the fairy ring vanishes.

Music, the art of uniting sounds so that they arouse the emotions and make appeal to the intellect. For a discussion of the natural laws governing musical sound, see SOUND. Music more than the other fine arts owes its value to its variance from nature, since in its present form it is far removed from the musical sounds of bird songs or wind; thus, though a statue must bear close resemblance to the thing which it copies, a mu-

MUSIC

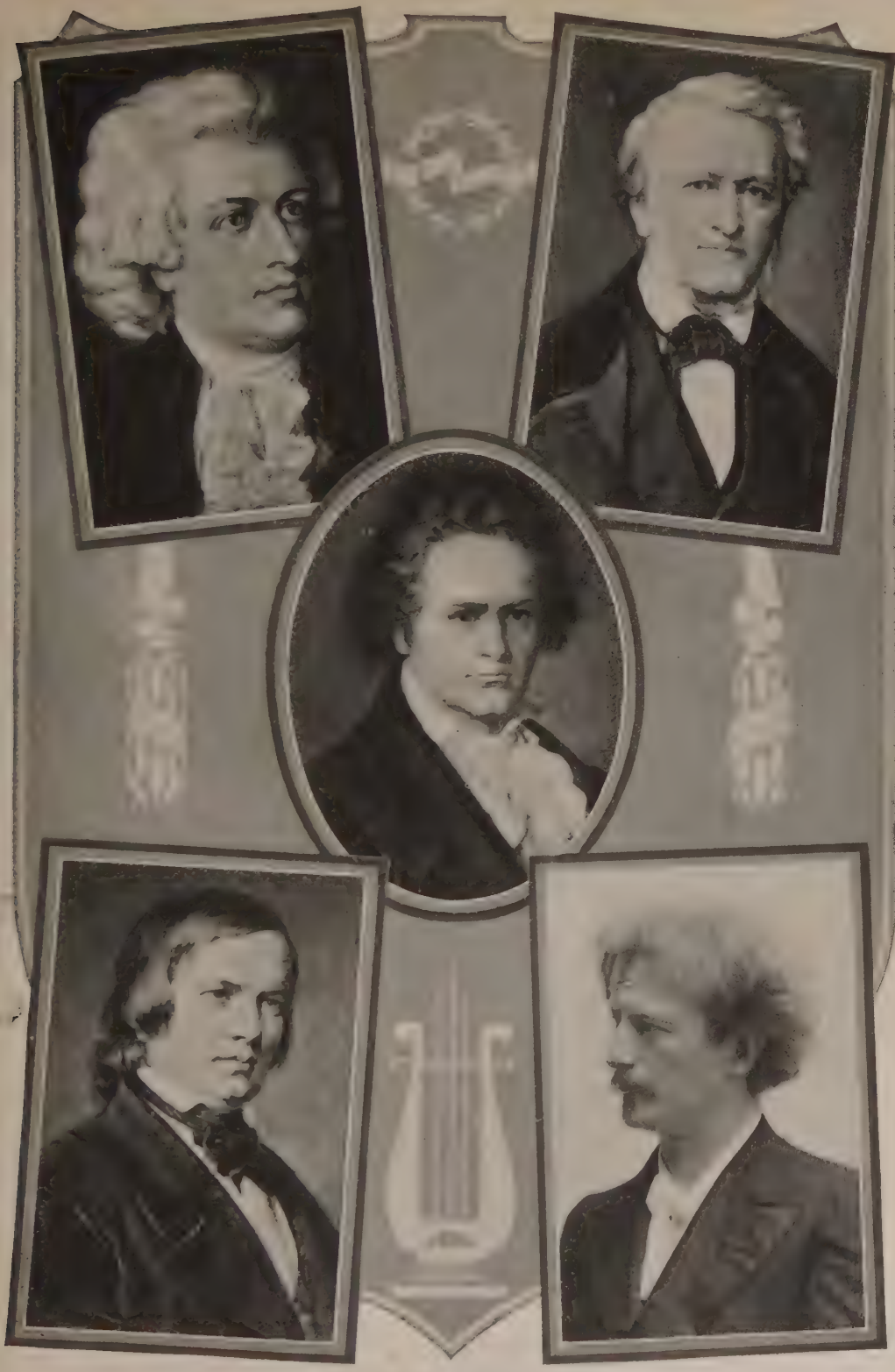
sical selection is wholly a mental product, artificial in that it has no model in nature. Because music was long unwritten, its early forms cannot be studied as those of painting, sculpture and architecture can be; hence in a double sense it is an elusive art existing wholly in the musician and dying with him unless a capable interpreter is found. Music has undergone many changes in the course of its development, and the music of one age or one people is usually unintelligible and inharmonious to another age or people. Familiarity with music, however, breeds respect, and music whose intervals are unusual and seemingly harsh at first hearing, upon acquaintance may become pleasing to the ear.

In the earliest music the emotional element was dominant; later, a reaction made music a mathematical science, almost wholly intellectual in tendency. Now, music which is both emotional and intellectual is considered representative of the modern trend.

HISTORY. *Early Period.* As has been said, music was at first wholly oral and may have had its origin in imitation of sounds of nature. The first musical instruments were probably the rude horns found in caves occupied during the Stone Age. Such instruments could produce but few notes, and thus the scale contained at first only two or three tones. This was gradually extended until the pentatonic, or five-toned, scale, which continued in use for many centuries, was formed; it is still employed among primitive people and remains in modern music in some of our simplest hymns, as *There is a Happy Land* and *Auld Lang Syne.* The songs used by the Jews in their Temple of worship and in festivals are not preserved, or, if preserved, are so altered as to be of little historical value. Musical instruments, such as the drum, cymbals, horn and harp became common and were used alone or as accompaniment to the human voice.

Greece. It is to Greece that we owe the formal advance of music as of the other arts; here the tetrachord, a scale of four tones, having one interval a half tone and the others whole tones, was most commonly used. Up to the time of Terpander (about 650 B. C.) this existed in many forms, called modes and further designated by the names of their originators. The lyre, the chief musical instrument, had only four strings, but could be tuned to any of the modes to adapt it to the voice of the singer; it was used chiefly to give the pitch. Terpander added a second tetrachord to the scale, making the first note of the second the same as the last note of the first; thus a seven-note scale was formed. A century later Pythagoras introduced the octave system, which is the foundation of modern music. Not long after, Athens was stirred with emotion over the music of Sophocles' *Antigone* and other dramas, the forerunner of the opera, but though the words of these are yet read with pleasure, the music has entirely disappeared. Were it in existence its chief value would probably be historical, since it would be heard by ears accustomed to modern harmony. It was sung unaccompanied except for a monotonous bass.

Rome. Roman music copied that of Greece but made no improvement upon it, and the art languished until it came under the influence of the Church. St. Ambrose made a collection of Hebre melodies that had lived only in memories of exiles from Palestine, and these were from them transmitted to the Christians at Rome. With his book of songs St. Ambrose wrote also a set of laws i composition. St. Gregory, about 200 years later, made a second collection and increased the number of modes from four to nine. These two collections of songs were known respectively as the Ambrosian and the Gregorian chants, and are both in use, though the latter is the more common. Wherever the missionaries of the Church went, these chants were sung, but the melodies were transmitted from memory, aided only by a notation of dots, curves and lines, called *neumes* and intelligible only

MASTERS IN THE WORLD OF MUSIC

LUDWIG VAN BEETHOVEN

WOLFGANG A. MOZART

RICHARD WAGNER

ROBERT A. SCHUMANN

IGNACE JAN PADEREWSKI

MUSIC

to one who had previously learned the tune.

Music, lacking concrete materials, lagged behind other fine arts up to the year 1100, but at that time the same spirit which was stimulating architecture began pervading music, and the construction of definite musical art forms resulted. Music became measured, and the multiplicity of details which grew up show definite proportions and relations each to each.

Middle Period. Hucbald, a monk of St. Amands, is responsible for the staff in musical notation, and this invention brought about a remarkable change, since it paved the way for part-music not heretofore used. This system of harmonies Hucbald called *organum* because they were played upon a great instrument of that name, unknown since the fall of Rome. The song consisted of a melody supported by a second voice singing the same a third above or a fifth below the original. Guido of Arezzo is the next great name in the history of music. He, with his pupils, copied all previously-learned melodies upon a four-line staff, an enormous work of incalculable value. He also founded the system of sight-reading by teaching his choir boys to remember their notes from the syllables beginning the lines in the hymn to St. John, which syllables, he noticed, were sung upon the successive notes of the scale. These syllables, *ut, re, mi, fa, sol, la,* with one addition and one alteration, are still in use. By means of these Guido taught the reading of an "unknown song."

Music from that time advanced rapidly, especially on the mechanical side, up to the 14th century. New musical instruments were invented, the length of notes was arbitrarily fixed and part-music became more varied. The troubadours of France and the minnesingers and mastersingers of Germany were the strongest force in secularizing music. See TROUBADOUR; MINNESINGER; MASTERSINGER; TROUVÈRE.

Modern Music. The beginning of musical composition in its present form was in Flanders, where a school of composers led by Dufay originated early in the 15th century. Little of Dufay's music is known, but its influence is remarked in the work of John Okeghem, one of the first teachers of the new music, and in that of Okeghem's famous pupil, Josquin Des Près, the first really great composer of the school. Though much of the music of Des Près and of his contemporaries was chiefly intellectual, there are many compositions that show a deeply emotional tendency and a passionate feeling unknown in the compositions of their forerunners. Orlando di Lasso was the last member of the Flemish group, and his compositions have delighted the world throughout the four centuries since he wrote.

During the same year England was evidently producing musicians of ability. A charming six-part song, *Sumer is icumen in,* shows great advance over other music of the times; its authorship is unknown, but the old manuscript still may be seen in the British Museum. John Dunstable was the only prolific English composer, and he is little known save through contemporaneous writers.

The Italian temperament seemed especially attracted to the new emotional music. Palestrina, though he composed music of the intellectual type, gave to his country the incentive to study the new music and to appreciate it. Palestrina's death occurred in 1594, the same year as Di Lasso's and the same year as the production of the first dramatic musical play by the Venetian musicians; thus that year may be said to mark the real beginning of the new era. Gradually but surely the emotional element pervaded the musical compositions until it had equal place with the artificial rules of time and arrangement. It was natural that in some places the pendulum would swing too far; thus musical plays that were light and graceful but that generally failed to conform to the rules of composition were written and rendered by the trouvères. The Venetian School, mentioned before, attempted a revival of classic Greek music. This re-

sulted in the production of several operas, introducing monody and the recitative form of dramatic music. The immediate appreciation of these productions carried with it such enthusiasm that the composers of the new school brought out many excellent works, the music and librettos of which were both of exceptional quality. The organ and other instruments seemed suddenly to become popular, and music-printing came to the aid of this art as printing already had to literature.

The oratorio, whose development was due to Filippo Neri, was born of this era. It was a musical play designed to teach religious subjects and was performed in the oratory of the church. The cantata (the *singing* piece), the sonata (the sounding piece), the tocatta, the sonata-allegro, and other forms of musical composition appeared and are comparable to the verse forms of literature. In Italy, Scarlatti, Stradella and Lotti; in England, Purcell; in France, Lulli; and in Germany, Keiser, Schutz, Scheidt and Schein were bringing music up to the glorious period of its history. The mechanical changes they introduced were the use of measures and of marks of expression.

The 18th century was introduced by the two great names, Bach and Handel. These men were both born in 1685 and lived to practically the same time, but exerted a widely differing influence upon the musical world. Handel gave his attention to the development of the orchestra and to experiment in orchestral compositions. Bach was the founder of modern technique and perfected the fugue, which up to his time had been a lifeless musical form. He gave new meaning to the organ and produced besides much excellent voice music. See HANDEL, GEORGE FREDERICK; BACH, JOHANN SEBASTIAN.

The names of this age are household words today and the compositions produced are still the standard of the musical world. The invention of the pianoforte, though at first not greeted with acclaim and thought only fitted for light music, became, under skilled fingers, a new means of expression, and the lyric poets of the period made necessary the invention of the *Lied*. Thus through Haydn, the master of symphonies; Mozart, who gave new life to the declining Italian operas; Beethoven, who added his emotional genius to all lines of musical advance; Rossini, whose melodies are best appreciated when unaccompanied by the text; Schubert, the inventor of the minuet; Mendelssohn, with his finished melodious productions; and Franz and Schumann, who best expressed themselves in song, music advanced to its present place among the fine arts. The revival of the opera adds the names of Bellini, Donizetti, Gounod and Thomas, whose chief faults lie in the lack of harmony between their music and the text. This fault was discerned by Wagner, the great prophet of the opera who through difficulties, disappointments and misunderstandings, achieved a final and lasting triumph. Among his fundamental rules he insisted that the music be an interpretation of the text, that the opera have an unassailable unity and that the libretto be of such excellence that it alone would serve as a dramatic production. The music of operas had no set form but followed the mood of the text. His work in the realm of opera was to lead composers to loftier ideals to make, not merely melody, but a powerful drama expressed through music as well as through words. Following Wagner came Verdi, the composer of *Aïda*, and Bizet, who produced *Carmen*.

Some races are especially well endowed with musical taste. Those which have traditional and inherited folk songs, the music nearest their lives and hearts, with gifted composers to handle them, show signs of creating national schools. Bohemia and the northern countries of Europe have produced much worthy folk music and many talented musicians.

Music, unlike painting and sculpturing, can scarcely be said to be national in its schools. The great musicians belong to the world, and their compositions, unlike great paintings, may be familiar

in every part of the world through great popular demand for the best. Thus the works of the great pianists, Liszt, Rubenstein, Strauss, Czerny, Cramer and Chopin; of the violinists, Ysaye and Kubelik; of the orchestra composers, Berlioz, Tschaikowsky, Saint-Säens, Massenet, Mendelssohn and Chaminade, no less than the works of the American composers, Paine, Chadwick, MacDowell and Parker, are enjoyed and understood everywhere regardless of the nationality which they represent.

The present tendency in music may be compared to the post-impressionistic and futurist tendency in painting and is manifest in a growing revolt against melody and definite themes; thus, the symphonic poems of Strauss and Mahler aim to express a mood and are unclear and restless. This musical impressionism is resulting in a style in which tone-picturing is followed by free modulation and full rich harmonies. Its leading spirits are Mahler, Debussy, Franck, Weingartner, Strauss and Reger.

Musk, a substance obtained from the musk deer and used in fixing the scent of expensive perfumes. The best is imported from Tonkin, China, while cheaper grades are obtained from India and Siberia. Musk is used to a limited extent in medicine. See MUSK DEER; PERFUMES.

Musk Deer, a small, deerlike animal, by some scientists classed in the Deer Family and by others placed as the single genus of the Musk Deer Family. It differs from deer in three particulars: both sexes are without horns; the upper canine teeth extend in long, curving tusks, that are sharp and strong; and the four toes are of nearly equal length, so that the animal can fairly grasp the precipitous rocks upon which it climbs. The musk deer is a solitary, timid creature, fleeing with remarkable speed at the approach of man. Its name refers to the musk gland of the male, situated below the abdomen and secreting a sirupy liquid, which, when secured by hunters and dried, forms the powdered musk which is a basis of many perfumes. The musk deer inhabits Siberia and Tibet, generally making its home in the highest regions. See PERFUMES.

Muske'gon, Mich., a city and the county seat of Muskegon Co., 38 m. n.w. of Grand Rapids, on Muskegon Lake, an enlargement of Muskegon River, about 4 m. from Lake Michigan. Entering the city are the Pere Marquette, the Grand Rapids & Indiana, the Grand Trunk and other railroads. Electric railways connect the city with adjacent towns, and steamboat lines with Chicago, Milwaukee and other lake ports. Muskegon has one of the finest harbors on Lake Michigan, ice-free throughout the year. The trade is chiefly in lumber, fruit, celery and other vegetables and in the local manufactures, which include motors, boats, electric cranes, furniture, billiard tables, refrigerators, curtain rollers, pianos, paper, knit goods and flour.

Through the munificence of Charles H. Hackley, a local lumberman, the city has a public school endowment fund of $2,000,000, and a manual-training school, which has an endowment of $600,000. Other gifts from the same donor are a public library, a hospital, a gymnasium, a public square, upon which have been erected a soldiers' monument and several bronze statues, and a poor fund endowment. In Hackley Park are statues of Lincoln and Farragut, and at the Hackley School, a statue of McKinley, all three the work of C. H. Niehaus. Muskegon was settled in 1834 on the site of a trading post established here in 1812. The town was laid out in 1849 and incorporated as a village in 1861; it received its charter as a city in 1869. Population in 1920, U. S. Census, 36,570.

Mus'ket, an army gun that has been quite generally replaced by the army rifle. The musket was a heavy, clumsy gun, loaded from the muzzle. The barrel was large and smooth-bore, and the gun was not very reliable. The older guns of this order were fired by means of the flintlock, wheel lock and, finally, by percussion caps. Later the musket was greatly improved, being made lighter and more accurate. In the early part of the

19th century the bore was rifled, giving to the bullet much greater penetration. See RIFLE; FLINTLOCK.

Musk'mel"on, a creeping vine of the Gourd Family, prized for its sweet, luscious fruit. The stem lies prostrate upon the ground and bears rough tendrils and coarse, five-angled, roundish leaves; the flowers are large, short-stemmed and of orange-yellow color. The fruit has a soft, gray-green rind, which surrounds a sweet, yellow pulp, on the inner surface of which the seeds are borne. The fruit is generally globular in form and from six to eight inches in diameter. The melons ripen in the summer and are a pleasing dessert. The favorite varieties are the cantaloupe and nutmeg melon. They are grown throughout temperate and subtropical climates, wherever there is a rich, warm soil. They should be planted in hills four to six feet apart and with six to ten seeds in a hill. To insure ready growth the hills should be well fertilized.

Melons are attacked by various insects which may be kept down by spraying the growing vines with Paris green or tobacco washes. Fungus diseases are checked by spraying with Bordeaux mixture. See INSECTICIDE.

Muskogee, *Mus ko' je,* **Okla.,** the county seat of Muskogee Co., situated 130 m. n.e. of Oklahoma City on the St. Louis & San Francisco, the Midland Valley, the Missouri, Kansas & Texas and other railroads. It is the commercial center of a large agricultural region and has an extensive trade in farm produce and live stock. There is an important oil field in the vicinity which furnishes an excellent grade of petroleum. The manufactories include cotton gins, cotton compresses, cottonseed-oil mills and flour mills. The city is the seat of several educational institutions in charge of religious denominations. Among these are Spaulding Institute (Methodist Episcopal Church, South), Nazareth Institute (Catholic) and Indian University (Baptist). Muskogee was founded in 1870. It was the chief town of former Indian Territory and the center of activities for the Five Civilized Tribes. It was chartered as a city in 1898. Population in 1920, 30,277.

Musk Ox, a heavy Arctic animal belonging to the Bovine Family and found only in eastern Greenland. It has a low, heavy head with long, curving horns. The fur is dark and long, half concealing the slender legs and growing so thickly upon the shoulders as to give the musk ox a humped appearance. The tail is short and almost concealed beneath the long fur. The name musk ox refers to its musklike odor, which does not, however, render the flesh unpalatable. Like buffaloes, the musk oxen travel in herds and when attacked form a close circle with the calves in the center, thus presenting to the foe an unbroken barrier of pawing hoofs, waving horns and blazing eyes.

Musk'rat", an American member of the Rat Family, living in woodlands and in water. It has a plump, fur-covered body, small head and long, hairless tail. Its thatched burrow is built near the bank of a stream and has an opening underneath the water as well as one above. The hind feet are webbed, as are those of all semiaquatic animals. The fur is soft and highly prized. The name muskrat refers to the musky secretion produced by both sexes. An Asiatic shrew, which secretes a like substance, is often wrongly called the muskrat.

Mus'sel, a group of chiefly salt-water Mollusks. The name is applied indefinitely to a number of genera, all of which have long, two-valved shells. They fasten themselves to rocks by means of a stringy secretion known as a byssus, which they can produce at will. Some are able to burrow into rock ledges or coral reefs for purpose of concealment. Mussels are eaten in great quantities in European countries but are not so highly prized as the oyster. River mussels, or fresh-water clams, are found in lakes and streams throughout the United States. See CLAM.

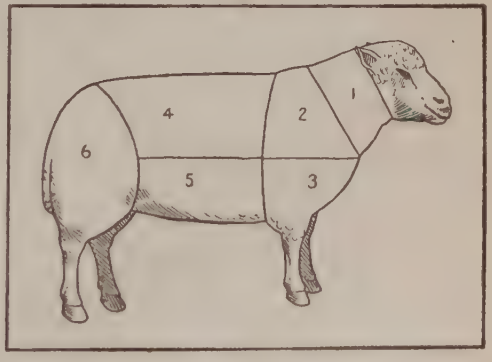
Musset, *Mu" seh',* **(Louis Charles) Alfred de** (1810-1857), a French poet, novelist and play writer. From law and medicine he turned to literature and was

recognized as a poet of distinction at the age of 20, but his early dramatic failures were sufficiently discouraging to cause him to give up publishing for some time. When his works finally appeared they were marked by extraordinary brilliance, passion and fancy, and he was accorded the rank of one of the greatest poets of his age. He saw the shortcomings of the Romanticists and Classicists, and, taking a middle ground, wrote in a style distinguished for its marked originality. His works include *Namouna, André del Sarto, The Caprices of Marianne, Night of May, The Confession of a Child of the Age, Bettine, Carmosine* and *No Trifling with Love.*

Mus'tard, a family of rank herbs which have escaped from gardens and are now found wild all over the United States. All members of the family are distinguished by their sharp, biting, watery juice. The stems are branching and tough, being so fibrous as to be almost woody; the leaves are coarse, deeply-cut and covered with stiff hairs. The bright or pale yellow flowers grow in slowly-opening clusters, those nearer the base of the stem blooming first and producing fruit before the upper ones open. The individual flowers are easily recognized by their four petals and four sepals, which are borne in the form of a cross. There are also four stamens, two of which are shorter than the other two. The fruit is an oblong pod having large, brown seeds; as these pods mature, the flower stems lengthen and hold the fruit out from the stem. Mustard seed is used as a condiment.

Mu'tiny, an uprising against constituted authority. The term is used specifically of sailors and soldiers in rebellion against their officers. Mutiny includes not personal rebellion alone, but an attempt to incite mutiny, refusal to expose a mutinous plot or those connected with it, or failure actively to oppose and seek to thwart any such plot. According to the *Articles of War,* in the United States and Great Britain it is a crime punishable by death for an officer or a private soldier who is present at a mutiny not to do everything in his power to suppress it.

Mutsuhito, *Moot' soo he' to,* (1852-1912), a great Emperor of Japan. In 1868, when about 55 leaders of the Progressive Movement took possession of the imperial palace, Mutsuhito took an oath to establish representative government, to appoint men to office for their ability, not for their rank, and to look for able men to help in the development of Japan. The young ruler quickly accepted Western ideas and became zealous for reforms. In 1869 he married a princess. The traditions and etiquette of Japan require that the sovereign's name and personality be kept in shadow, and his acts are not publicly discussed. Mutsuhito, however, was known as a man of ability, and the tradition of extreme exclusion expected of the Japanese ruler was somewhat broken down by the celebration of the Emperor's 50th birthday and of his silver wedding. In 1887, Yoshihito, a son of the Emperor, was proclaimed heir, and he succeeded to the throne in 1912, on the death of his father. When Mutsuhito began to rule, Japan was dominated by the 16th-century ideas; by his wise statesmanship, vision and courage he helped make her a progressive world-power.



MUTTON

Mut'ton, the flesh of sheep. Mutton is a delicately flavored and highly nutritious article of food. After the animals are slaughtered, the dressed carcasses are placed in cold storage for several days to allow the meat to "ripen" before be-

ing placed on the market. Most of the mutton used in the United States is prepared by the packing houses. The diagram shows the cuts into which the wholesale dealer divides the carcass; 1 is the neck; 2, the chuck; 3, the shoulder; 4, the loin; 5, the flank; 6, the leg. Large quantities of mutton are shipped from Argentina and Australia to Europe in refrigerator ships. See MEAT PACKING.

My Country 'Tis of Thee. See HYMNS, NATIONAL.

Myr"iap'oda, a name once given to the group of Arthropoda that included the centipedes and the millipedes. In the newer classifications the term has been replaced by a more inclusive one and the name has now no scientific significance. In popular use an earwig that is common in southwestern United States is spoken of as a myriapoda.

Myrmidons, *Mur' mi dons,* in myths a people of the southern borders of Thessaly who accompanied Achilles to the Trojan War. According to some authorities they were originally ants. The word now signifies the followers of a bold leader or the merciless agents of some ruthless power.

Myrrh, *Mur,* a gum exuding from the trunk of a small tree of the Rue Family. The tree, a native of Arabia and East Africa, is low, with ragged, gray bark and thorny branches. The leaves are few and small, and the flowers are inconspicuous but have a strong balsamlike odor. The fruit, which is not much larger than a currant and is an egg-shaped stone fruit, has the same balsamic odor and a bitter taste which lingers in the mouth. The gum, or gum resin, for which the tree is noted, oozes from the bark in oily drops, which grow hard and dark with age. In this form it is put upon the market for use in perfumes, ointments and medicines. The myrrh spoken of in the Bible in connection with frankincense is the product of a tree of an allied genus. This myrrh was among the gifts brought by the Wise Men to Jesus, and earlier it is spoken of as being used in the rites of purification and sacrifice. The so-called myrrh of England is really cicely, a plant of the Parsley Family, called myrrh because its odor resembles that of the Eastern plant.

Myrtle, *Mur' t'l,* a tree native in the Mediterranean region and the tropics, belonging to the Myrtle Family and represented in North America only by house plants. The tree has smooth, shining leaves whose peculiar blue-green color has been named myrtle-green; they are long-oval in shape and are evergreen. The leaves as well as the bark and flowers are aromatic and are of use in the manufacture of perfumery and of a condiment. The flowers are single or double and may be white or pink-tinted in color. There are many stamens. The fruit is a black, seedy berry also having a spicy flavor. The low trailing herb, sometimes called myrtle, is really periwinkle, a member of the Dogbane Family.

Mythology, *Mi thol' o jy,* the science of myths or the body of myths belonging to any people, as Greek mythology or Norse mythology. The term is also used to denote the literature pertaining to myths. The origin of myths is uncertain, and a number of theories have been advanced to account for them. While many of these theories are of ancient origin, it is only in recent times that systematic attempts have been made to solve the problem of myths. All students of mythology recognize the following facts: (1) that myths are common to all primitive and partially civilized people; (2) that myths are fully believed by those among whom they are used; (3) that among all peoples they attempt to answer the same question; (4) that all myths are easily divided into two classes, those which need no explanation and those which require explanation. Those myths, for instance, which represent the gods and goddesses as wise and good, the embodiment of the highest attributes of character, are rational and need no explanation. On the other hand, those which represent the gods as ruled by the baser passions and as tricky and revengeful require explanation, but satisfactory explanations for this class of myths are not easily found. The ancient Greeks considered

them to be the invention of poets and orators, solely for effect, some going so far as to censure Homer and Hesiod for introducing such tales into their writings. Plato refused to admit Homer's writings in his *Republic* because of the myths they contained.

The latest authorities generally believe that myths are the outgrowth of attempts of primitive peoples to answer their questions concerning the origin of the earth, of the race, of animals, of the placing of the stars, of death and of the existence of the soul after death and many other like questions. Stories were invented to answer these questions, and however absurd or imbecile these stories may appear to civilized men, they were satisfactory and acceptable to the primitive people among whom they originated. These fables were handed down by tradition from generation to generation and became as precious an inheritance to the people of old as are the religious beliefs cherished by the civilized nations of the present day. Doubtless many fables were invented for moral and other effects. The myths most generally studied in schools and referred to in our literature are those of the Greeks and Romans, the Persians, the ancient Egyptians and the Scandinavians.

Greek and Roman Myths. The Romans were an intensely practical people, and they borrowed most of their fables from the more imaginative Greeks, who doubtless imported many of them from Egypt and the East. Greek and Roman mythology explains the origin of all things by supposing that in the beginning there was a boundless space, which they named Chaos. Out of Chaos came Earth (Gæa) and Love. From these came in succession Uranus (Heaven), the mountains, the sea and plants and animals. Two other children of Chaos were Erebus and Nox (Night), and from these sprang light and day. To Uranus and Gæa were born 12 children, collectively known as the Titans. In time Saturn, one of the Titans, overthrew Uranus, and he and his sister Rhea reigned supreme until they in turn were overthrown by Jupiter, the youngest of the Titans. Jupiter divided the Universe by lot. He received the land; Neptune, the sea; and Pluto, Hades, or the lower regions. Juno, the sister and wife of Jupiter, was queen of heaven. Jupiter had his abode on Mt. Olympus, where also dwelt the great gods and goddesses—Apollo, Diana, Juno, Mars, Mercury, Minerva, Venus, Vesta and Vulcan. Ceres, who was also the sister of Jupiter, usually dwelt upon the earth. Upon these beliefs the great system of Greek and Roman mythology, with its many lesser deities, was built. By reading articles on the deities mentioned a more detailed account can be obtained of the various myths of the ancients.

Norse, or Scandinavian, Mythology. Norse mythology was common to all Teutonic peoples. A comparison with Greek and Roman mythology shows that while differing in details the two systems have the same idea as a foundation. This system accounts for the origin of things by supposing that in the beginning there was a vast abyss bounded on the north by mist and on the south by light. In the mist 12 rivers rose and flowed into the abyss, where they were frozen. The heat from the light melted the ice, and from the rising mist Ymir, the father of the giants, and the cow, Audhumla, arose. The cow was nourished by the salt, which she obtained by licking the ice, and the cow's milk nourished Ymir. The god Buri came out of the ice, and from him all the gods were descended. Odin and his two brothers, grandsons of Buri, killed Ymir, and from him formed the earth. There were 24 great gods and goddesses who were immortal and dwelt in Asgard, a realm generally supposed to be above the earth. There were also numerous lesser gods and goddesses, each having special powers and duties. Consult Bulfinch, *The Age of Fable;* Guerber, *Myths of Greece and Rome* and *Myths of Northern Lands.*

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NAGASAKI, *Nah' ga sah' ke,* a city and port of Japan, situated on a small peninsula in the northwest of the Island of Kiushiu. The harbor forms a favorable anchorage, and it is a stopping place for ships coming to coal, as well as the first port of entry on approaching Japan from the south or the west. The principal exports are cotton goods, marine products and coal; the imports include raw cotton, iron and other metals. Three large docks, a patent slip and the Akanoura Engine Works represent the important industries. In the 16th century Nagasaki became the headquarters of Christianity in Japan, and in 1858, together with four other ports, was opened to British and American trade. Population in 1905, 163,324.

Nagoya, *Nah' go ya,* one of the largest cities of Japan, situated upon the Island of Hondo, 170 m. s.w. of Tokyo. It is the capital of its province and is a beautiful and interesting city, well laid out and possessing many places of interest and importance. Among these are a historic castle, several monasteries, temples and an excellent college. The industries include the manufacture of lacquered ware, fans, porcelain, cotton, silks and embroideries. Population, 378,231.

Na'hum, one of the books of the Old Testament, the author of which, Nahum, was one of the 12 minor Hebrew prophets. He is thought to have prophesied between the two invasions of Sennacherib. Both date and authorship of the book, however, have been the subject of dispute. The prophecies of the book of *Nahum* foretell the destruction of the enemies of Jehovah and the capture and destruction of the city of Nineveh. See BIBLE, subhead *The Old Testament.*

Naiads, *Na' yadz,* in Greek mythology, the nymphs of the springs and of rivers. Caves were sacred to them and were believed to be their dwellings. Because of the medicinal qualities of some springs, the Naiads appear as healing divinities.

Nail, in anatomy, a part of the outer skin, with its horny layer highly developed. It consists of a root, a visible, transparent part or body lying on the dermis, with which it is continuous, and a free rim at the tip of the finger or toe. That part of the dermis on which the nail is formed is called the matrix, and the opaque area extending out from it and visible as a half-moon is the lunule. The nail is renewed from the bed of the dermis beneath and is pushed outward from the matrix. See SKIN.

Nails, small, slender pieces of metal with round or flattened heads, and generally pointed. They are made of iron, steel or copper and are used for a large variety of purposes, principally for driving into timber or other materials in order to hold separate pieces together. There are at least 200 kinds of nails, the most common being wrought, cut, wire, horseshoe and shoe nails. Nails were originally made by hand, being forged on an anvil from bars of iron made for the purpose and called nail rods. For many centuries this was the only method of making nails, and during the colonial days in America almost every household contained the necessary tools and material for making them. They often passed for currency, like beads among the American Indians. In Birmingham, England, men, women and children were engaged in making nails for many years, by this process. At the present time all nails are made by machinery.

CUT NAILS. Cut nails are made from plates of wrought iron, rolled into flat bars the thickness of a nail and slightly wider than the length of the nail, in order to allow for the material in the head. They are cut tapering by means of a shearing device, which consists of a pair

of powerful and sharp jaws, which seize the bar and bite off just sufficient material of the proper shape to form the nail. A viselike die grasps the nail, and the head is formed by a single blow from a hammer operated by the machine. The nail plate, as the flat bar is called, is held in such a way that it turns alternately to the right and the left after each nail is cut, so that no material is wasted by the tapering of the nails.

Wire Nails. Wire nails are made from steel wire, which is made for the purpose and wound on a reel, from which it is fed into a machine. Automatic devices are arranged in this machine so that the wire is first straightened between rollers, then cut the proper length by cutters. Shears operating from two different directions shear off the end into a point, after which the nail is seized in a viselike die, while a hammer forms the head. One machine will make from 150 to 500 nails per minute, requiring but little attention or labor, the quantity depending upon the size of nails made.

Other Varieties. Copper nails are usually made from wire, and they are used chiefly in ships or boats, since they do not rust. Horseshoe nails are soft and can be readily bent and clinched. While formerly made by hand, they are now made almost entirely by machinery.

Sizes. The sizes of nails are designated by the term *penny*, referring to the number of pounds that 1000 nails will weigh; as, for instance, six-penny nails, ten-penny nails, etc., meaning that 1000 six-penny nails weigh six pounds and 1000 ten-penny nails weigh ten pounds. Large nails are called spikes and small ones are known as brads or tacks, according to their shape. See Iron and Steel.

Nanaimo, *Na ni' mo,* a city of Canada in the Province of British Columbia, situated on the eastern coast of Vancouver Island. Steamboats connect it with Vancouver, Sydney and Comox, and the Esquimault & Nanaimo Railway with Victoria. There are five churches, several stores and banks. The Western Fuel Company, having its headquarters in Nanaimo, gives employment to some 600 miners. The export trade in coal and fish is large, the coal being sent principally to San Francisco. The surrounding region is favorable for farming and fruit growing. Population in 1911, 8306.

Nan"king', or **Nankin,** a city of eastern China famous as the literary center of the republic. It is located upon the Yangtse-kiang about 130 m. direct from its source, and is 580 m. s.e. of Peking, with which city it has direct connection by means of the Yangtse-kiang and the Imperial Canal. A wall divides the portion of the city occupied by the Manchus from that of the Chinese. Nanking is noted for its manufacture of paper, cannon, artificial flowers, crape, China ink and "Nankeen" cloth. Its most interesting buildings are the "tomb of the kings" guarded by huge armed figures, the government house, the royal printing house, a large arsenal and the observatory. Nanking is now a treaty port, but is not yet of great importance for its foreign commerce. Population, 267,000.

Nansen, *Nahn' sen,* **Fridtjof** (1861-), a Norwegian scientist and Arctic explorer, born at Fröen and educated in Christiania University, where he made a special study of zoology. At the age of 21 he made a voyage to the waters around Greenland. On his return he was appointed curator of the Bergen Museums. During the next four years he wrote a number of papers on zoological and histological subjects, some of which attracted wide attention. In 1887 Nansen began preparations for an expedition across the ice fields which cover the interior of Greenland, and the following summer he undertook the expedition. Greenland was crossed successfully, though the party suffered almost incredible hardships. The company spent the winter on the west coast of the island among the Eskimos. On his return to Norway in 1889, Nansen published two works as the result of this expedition. They were *Eskimo Life* and *The First Crossing of Greenland.*

Nansen's greatest contribution to geography, however, was the result of his

polar expedition in the *Fram,* 1893-96. His study of the sea during his former expedition convinced Nansen that there was a drift current from Bering Strait and the vicinity of the New Siberia Islands to the east coast of Greenland. He believed, therefore, that if a ship were fixed in the ice north of Eastern Siberia it would drift with the current. The *Fram* was constructed for great resistance to ice pressure, and the experiment proved the correctness of the theory. When satisfied that the *Fram* would drift as he had anticipated, Nansen and one companion, Johansen, attempted to reach the Pole. They attained 86° 14′ N., the highest latitude that had then been reached, when they were compelled to turn back. After spending the winter on Franz Josef Land, they were taken home by the Jackson-Harmsworth Expedition, reaching Norway in August, 1896. The *Fram* arrived a little later. Upon Nansen's return he received the highest honors of the learned societies and universities of Europe and America. His *Farthest North* is a popular narrative of the expedition. *The Norwegian North Polar Expedition, 1893-1896; Scientific Results* is a more elaborate treatment of the scientific results attained. In 1906 Nansen was appointed minister to England, and in 1908 he became professor of oceanography in Christiania University. See POLAR EXPLORATIONS.

Nantes, *Nants,* a city of France, capital of the Department of Loire-Inférieure, situated on the River Loire, 215 m. s.w. of Paris and at the junction of the Erdre and the Sèvre-Nantaise rivers. The city is built upon the banks of the rivers and on numerous islands, which are connected by bridges. The prominent buildings include the Cathedral of St. Pierre, the Hôtel de Ville, the Palace of Justice, the Church of St. Nicholas and museums of paintings and natural history. The Place Royale of Louis XVI is one of the most noted open places in the city. Nantes contains a number of monuments celebrated for their sculpture. The educational institutions include hydrographical schools, schools of agriculture and numerous learned and industrial societies. The public library contains about 200,000 volumes, and the city maintains an observatory and a botanical garden. The leading industries include shipbuilding and the manufacture of textiles, soap, machinery, glass, chemicals, metal wares, pottery and distilled liquors. Large ships reach the city through a canal, and an extensive foreign trade is carried on. In the Middle Ages Nantes was the capital of Brittany. It was from here that Henry IV issued the Edict of Nantes in 1598. Population in 1911, 170,535.

Nantes, Edict of, a proclamation issued by Henry IV of France, Apr. 13, 1598. Its object was to give religious liberty and legal status to the Huguenots, or Protestants, of France. This celebrated Edict granted the Huguenots the right of worship, of holding office, of having a Protestant chamber in the Parlement of Paris and joint chambers in the local Parlements. In 1685, Louis XIV revoked this Edict. Thousands of loyal French, mostly of the middle class, were driven into exile, and England and Germany were enriched at the expense of France.

Nanticoke, *Nan′ ti koke,* **Pa.,** a city of Luzerne Co., 8 m. s.w. of Wilkes-Barre and 80 m. n.e. of Harrisburg, on the North Branch of the Susquehanna River opposite West Nanticoke, and on the Pennsylvania and the Central of New Jersey railroads. It is situated in the Wyoming Valley, which is noted for its fields of anthracite, and is chiefly engaged in mining, but has large silk and hosiery mills, agricultural-implement works, flour and grist mills, a canning factory, lumber mills and cigar factories. The town was settled in 1850-55 and incorporated as a borough in 1874. Population in 1920, 22,614.

Nantuck′et Island, an island off the coast of Massachusetts, e. of Martha's Vineyard, about 15 m. long and the largest of a group of islands constituting Nantucket County. It is about 20 m. from the mainland and has an area of 31

sq. m. Nantucket, the county seat, is the chief town, and was formerly noted for its extensive whale fisheries. It has a deep harbor, but is now of importance only as a summer resort.

Naphtha, *Naf' tha,* a colorless, volatile and highly inflammable oil obtained by distillation from petroleum and such substances as India rubber, asphalt, bituminous shale and coal tar. That obtained from crude India rubber is called caoutchouc naphtha, while that from coal is coal-tar naphtha. Petroleum naphtha is sold as such, or is redistilled and the lighter oils of gasoline and benzine are separated from it. Methyl alcohol, or wood alcohol, is sometimes called wood naphtha. Shale naphtha is distilled from bituminous shales. Naphtha is used as a solvent and in the manufacture of paints and varnishes, as a burning fluid for illumination, and, when mixed with benzine, for gasoline engines. See PETROLEUM.

Napier, *Na peer',* **Sir Charles James** (1782-1853), a British general and statesman, born at Whitehall, London. He was the son of Col. George Napier, who had him gazetted an ensign in the 33rd regiment in 1794. Three years later he was appointed aide-de camp to Sir James Duff, and in 1800, lieutenant in the 95th Rifle Brigade. In this capacity he was trained under the immediate supervision of Sir John Moore. After serving in the Danish campaign of 1807, having become major in the 50th regiment, he was ordered to Portugal. Here, at the Battle of Corunna, he received the commendation of Sir John Moore for his gallantry in leading the advance of his regiment. Napier was seriously wounded and was taken prisoner, but was allowed to return to England, where he remained until his exchange was effected.

After further service during the Napoleonic wars and in the War of 1812, Napier entered the military college at Farnham. Having completed his military education, he was, successively, inspecting field officer at Corfu, and governor and military resident at Cephalonia. He retired from military employment in 1830, but was appointed major-general in 1837 and the following year was made a K. C. B. In 1842 he was ordered to Sindh, India, then in a very turbulent state, and in two brilliant victories, at Miani and Hyderabad, succeeded in destroying the power of the ameers. His subsequent administration was very successful, but he quarreled with the directors of the East India Company, and retired in 1847. His last years were spent near Portsmouth, England, where he devoted himself to literary work. Napier was brave almost to rashness, and, though inclined to quarrel with his superiors, was one of the most remarkable military men of his time.

Naples, *Na' p'lz,* a city in southern Italy, the largest in the kingdom, formerly the capital of the Kingdom of the Two Sicilies, situated on the northern shore of the Bay of Naples, about 120 m. s.e. of Rome. Its site vies with that of Constantinople in being the most beautiful in the world. It is built in part on the shores of the beautiful bay; in part it climbs the surrounding amphitheater of hills. Above all, in gloom and grandeur, looms the massive Vesuvius. The older part of the city has crowded streets, where festivals, processions, and peddlers and the true Neapolitan life in all its noisy gayety can be seen. To the west the streets are wide and the buildings are modern. The prominent buildings are the Cathedral, the Castello Nuovo, the Castello dell' Ovo, the Castello Sant' Elmo, the churches of San Paola Maggiore, San Domenico Maggiore, the Annunziata and about 400 others, the university, the National Library, an engineering school, opera houses and theaters, a national museum, several hospitals, charitable institutions and schools.

The manufactures are important chiefly because of their number; they include ships, locomotives, stationary engines, cars, linen and silk products, cotton, woolens, china, artificial flowers, perfumery, soap and musical instruments. The commerce is of greater importance, steamship communication being maintained with almost all parts of the world.

Fruits, nuts, paper, hemp, wine and brandy are the principal exports. Naples was originally a Greek colony, and was successively in the hands of the Romans, the Ostrogoths and the Byzantines; in 1130 it was recognized as the metropolis of the Kingdom of the Two Sicilies. The ravages of cholera in 1884 brought about an effort to relieve the miserable conditions of the unsanitary slum districts, and extensive improvements were effected. Population 697,917.

Naples, Bay of, an inlet of the Mediterranean Sea on the southwest coast of Italy. Its mouth is 22 m. wide and extends from Cape Miseno on the northwest to Cape Campanella on the southeast. Naples, Pozzuoli, Portici and a number of other cities are on the shores. Back of the cities are Vesuvius and Monte Sant' Angelo, which add much to the scenery. The Bay of Naples is considered to be one of the most beautiful bodies of water in the world.

Napoleon I (1769-1821), Emperor of the French. He was descended from the patrician Italian family of Bonaparte, and was born at Ajaccio, Corsica, the son of Carlo Bonaparte, an advocate of some repute (See BONAPARTE). He entered the royal military school at Brienne in 1779, and in 1784 was sent to the military school at Paris. In 1785 he closed a scholastic career which had been creditable but not brilliant, and entered the artillery service, becoming lieutenant the following year.

When the French Revolution broke out he chose the popular side, although most of his fellow officers of Valence, where he was stationed at the time, sided with the Royalists. In 1793, having been made a lieutenant-colonel of artillery, he set out to assist in the reduction of Toulon, then in the hands of the English; and it was his strategic plan of attack that led to the capture of the place. For this service he was made brigadier-general of artillery. He again came into prominence in 1795 when the mob in Paris threatened to attack the National Convention. With only one night for preparation, and with a force of only 5000 troops, he defeated the National Guards, 30,000 in number, disarmed the populace, and secured victory for the Convention, which rewarded his services by giving him the command of the Army of the Interior.

CAMPAIGN IN ITALY. In February, 1796, the Directory put Napoleon in command of the Army of Italy. A few days later he married Josephine, widow of Alexandre de Beauharnais. Proceeding to Italy against the forces of Austria and Sardinia, numbering 75,000 men, Napoleon by a succession of brilliant victories and rapid campaigns with his army of 40,000 forced Austria to sign the Treaty of Campo Formio in 1797, exceedingly favorable to France, while peace treaties were also made with Modena, Parma and Naples, and the Pope was compelled to yield part of his dominions.

CAMPAIGN IN EGYPT AND SYRIA. Napoleon returned to Paris, the idol of France; indeed his popularity was so great that the Directory feared his ambition and gladly commissioned him to carry war into Egypt, as a preliminary step of crippling England by the conquest of British India. His victories at Alexandria, the Pyramids and Cairo were made fruitless by the naval victories of the English under Nelson, which cut off his means of returning to France. He then proceeded into Syria, and was everywhere victorious except at Acre, where he was compelled to abandon the siege.

FIRST CONSUL. Returning to Egypt and thence to France late in 1799, he found the Directory very unpopular, the credit of the government gone, and his brilliant work in Italy largely undone. Securing the cooperation of Moreau and the other generals in the capital, he abolished the Directory on the 9th and 10th of November, 1799. A new constitution was then drawn up and promulgated, providing for a government by three consuls, known as the Consulate. Napoleon was made first consul for a period of ten years; and, as he had the power of appointing to all public offices, pro-

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His genius made and unmade kings and changed the map of Europe.

posing all public measures and exercising jurisdiction over all administrative affairs, civil and military, he was virtual ruler of France.

Napoleon's policy now became more clearly defined: to establish order and prosperity at home, humiliate the enemies of France and extend his own power. Aware that his genius was essentially military, he brought the issue to a head by offering peace to England, Austria and Turkey in such terms that it was rejected; and then resolved to strike the first blow at Austria. Gathering an army of 36,000 men, he crossed the Alps and renewed the glories of his former Italian campaigns by the defeat of Austria, which was forced to sign the Treaty of Lunéville (Feb. 9, 1801); treaties were made with Naples, the Pope, Bavaria, Portugal, Russia, Turkey; and finally the Peace of Amiens (March 27, 1802) settled disputed points between France, England, Spain and Holland. Thus it seemed as if a universal cessation of hostilities had finally come. On Aug. 2, 1802, Napoleon was proclaimed consul for life by decree of the Senate.

Emperor of France. It was during this period that Napoleon rendered his greatest service to France, by his administration of civil affairs, which was marked by sagacity and energy. A general amnesty made it possible for all exiles to return home; education was fostered, especially the study of mathematics, the physical sciences and those subjects that promoted efficiency in the public service; and, most important of all, he assembled the first lawyers of the nation to draw up a code of civil laws (See Law, subhead *Code Napoleon*). On the other hand, all appointments were in his hands, even to the mayors of cities, so that no vestige of political liberty remained. He reconstructed the electoral bodies in such a way as to make still further aggrandizement of power possible on his part; and on May 18, 1804, he assumed the title of Emperor, over 3,000,000 popular votes ratifying his action.

Meanwhile disturbances in Switzerland in 1802 had induced him to undertake armed mediation in its affairs. England had declared war in 1803, claiming an infringement of the Treaty of Amiens. By 1805 England had succeeded in forming against Napoleon a coalition of European powers, including England, Russia, Austria and Switzerland. Napoleon marched against Austria with the army he had collected for the invasion of England, 180,000 strong, and forced Mack, the Austrian general, to capitulate at Ulm. The next day the fleets of France and Spain were defeated by Nelson at Trafalgar, making England mistress of the seas (See Trafalgar); but Napoleon completely routed the combined Austrian and Russian armies at the Battle of Austerlitz on Dec. 2, 1805 (See Austerlitz, Battle of). As a consequence Russia retired from the contest, and Austria immediately sued for peace, giving up all her Italian and Adriatic territory. Prussia gained Hanover for her neutrality. Joseph Bonaparte was made King of Naples, and the Batavian Republic was changed to a dependent kingdom, with Louis Bonaparte as its leader under the title King of Holland. Still more important, however, was the forming of the Confederation of the Rhine and the breaking up of the Holy Roman Empire. This, Napoleon accomplished by reducing the number of states comprising the Germanic system to about 40, and absolving the feudatories of the Holy Roman Empire from their allegiance to the Emperor, who laid aside his imperial crown and used as his highest title, Francis I, Emperor of Austria.

This and the proposal to restore Hanover to England led Prussia, hitherto neutral, to declare war against France in October, 1806. Napoleon defeated the enemy at Jena, on the same day that one of his generals, Davout, gained a brilliant victory at Auerstädt. The French army entered Berlin in triumph, and here Napoleon issued his celebrated Berlin Decree, prohibiting commercial intercourse between Continental ports and

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England, whose commerce he thereby hoped to destroy. His policy of injuring England's commerce is known as the Continental System. He then marched north against Russia, whose army was advancing to assist Prussia, and on June 14, 1807, won the Battle of Friedland. By the Treaty of Tilsit, signed in July, Prussia was stripped of half her territory, out of which the new Kingdom of Westphalia was made, with Jerome Bonaparte as king; the Duchy of Warsaw was erected into a kingdom and given to the King of Saxony; Russia agreed to close her ports to British trade, but received a part of Prussian Poland, and by secret articles was allowed to seize Finland from Sweden.

Napoleon's only open foe now was England, which the Berlin Decree had antagonized but not injured. Indeed the hardship of the decree fell chiefly upon the Continental commerce, and made it one of the factors in the downfall of Napoleon. When Portugal refused to close its ports, Napoleon sent Junot to occupy Lisbon (Nov. 30, 1807), and the royal family fled to Brazil. The Pope refused to carry out the Continental blockade and to recognize Joseph Bonaparte as King of Naples, and Rome was occupied by the French. Civil troubles now broke out in Spain, and Napoleon sent Murat into the country. The weak King Charles IV resigned his crown to Napoleon, who tried to place his brother Joseph on the throne. The Spanish people rose in revolt, and aided by the English maintained a stubborn resistance for seven years, in what is known as the Peninsular War. In the meantime Austria again declared war, but was crushed by Napoleon at the Battle of Wagram, July 6, 1809, who then entered Vienna and dictated his own terms of peace. In December of the same year he divorced the Empress Josephine, and Apr. 2, 1810, married the Archduchess Marie Louise of Austria. Their son, born March 23, 1811, received in his cradle the title King of Rome.

Napoleon's Downfall. The years 1810-11 marked the height of Napoleon's power. His empire reached from Denmark to Naples, with a population of 42,000,000 people, while his sway was almost undisputed in Italy, Switzerland and the Confederation of the Rhine. But the tide now began to turn. His arbitrary rule and summary disposal of kings and kingdoms, together with the devastation of homes caused by perpetual war and the raising of army after army, were beginning to arouse the people as well as the monarchs of Europe. He had, in fact, met his first check in Spain. In 1812 Russia refused to obey the Berlin Decree, and Napoleon invaded the country. He was successful in his battles, but entered Moscow Sept. 14 only to find it deserted. Two days later the city was burned, and retreat became inevitable. The bodies of the French soldiers strewed the long line of that terrible retreat, overcome by cold, famine, disease and fatigue. Only 25,000 men returned of the magnificent army of 650,000 that had undertaken the campaign. Soon after the crossing of the River Beresina, Napoleon hurried on to Paris, leaving the army in charge of Murat, and immediately began to gather another army to meet his enemies.

All Europe was now aroused, and a sixth coalition was formed against him early in 1813, composed of Prussia, Russia, England, Sweden and Spain; and later, Austria. Napoleon won the battles of Lützen, Bautzen and Dresden against the allies; but was forced to retreat to Leipsic, where he was defeated in the "Battle of the Nations" Oct. 16-19, 1813. He still maintained the unequal fight, however, gathering another army with a fertility of resource and genius for organization truly marvelous, and defeated the allies again and again. But he was finally crushed by numbers, the fortifications of Paris were taken March 30, 1814, and the next day Wellington and Alexander marched into the city.

Napoleon abdicated in April. He was allowed the Island of Elba, with the title of Emperor and a revenue of 6,000,000 francs. Ten months later he escaped

from the island, and by his triumphal march on Paris surprised the allies, who were still trying to come to some agreement respecting the disputed boundaries of Europe. He won the victory of Ligny against Blücher; but the French army was completely crushed at the famous Battle of Waterloo, June 18, 1815, and Napoleon's power was forever broken (See WATERLOO, BATTLE OF). He gave himself up to the English, and was sent to the island of St. Helena, where after six years of lonely brooding he died May 5, 1821. He was buried on the island, but his remains were taken to Paris in 1840 and placed beneath the dome of the Hôtel des Invalides.

Napoleon III (Charles Louis Napoleon Bonaparte) (1808-1873), Emperor of the French from 1852 to 1871. He was the third son of Louis Bonaparte, brother of Napoleon I and King of Holland, and of Hortense Beauharnais. After the death of his cousin, the Duke of Reichstadt, he became the recognized head of the Bonaparte family, and from this time on he endeavored to obtain possession of the throne once occupied by Napoleon I. After several futile attempts, he found his opportunity in the July Revolution of 1848, resulting in the abdication of Louis Philippe and the establishment of the Second Republic. Louis Napoleon was elected to the presidency on Dec. 10, 1848. Three years later, a contest having arisen between the President and the National Assembly, the former caused the arrest at night of the most prominent deputies in opposition to him, and of other popular leaders in Paris. The next day, Dec. 2, 1851, the city was placarded with notices of the dissolution of the Assembly and announcements of a new constitution to be submitted to popular vote. The people sustained the action of the President by a huge majority, and extended his term of office to ten years. By a similar method he had himself proclaimed Emperor Napoleon III on Dec. 2, 1852, and the Second Empire was established.

Napoleon's rule was marked by three important European wars—the Crimean (1853-56), the Austro-Sardinian (1859) and the Franco-German (1870-71). In the Crimean War he befriended Sardinia, struggling for Italian freedom, and he encouraged Cavour in the furtherance of his plan for Italian unity (See CAVOUR, CAMILLO BENSO DI). He also agreed to support Sardinia in case of Austrian aggression. Although the allies won decisive victories over Austria in the war which followed, Napoleon selfishly entered into negotiations of peace with Francis Joseph, Emperor of Austria, before the cause of United Italy was won. Shortly after, the Civil War broke out in the United States, and Napoleon took advantage of the difficulties of the American Government by attempting to realize his uncle's dream of a Latin-American empire under the protection of France. Maximilian, Archduke of Austria, was placed at the head of Mexico, with the title of Emperor, but after the Civil War the United States succeeded in defeating Napoleon's designs (See MONROE DOCTRINE).

In 1870 the French were called upon to face the Franco-German War. Napoleon was obliged to recall his troops from Rome, and Italy was enabled to complete the work of national unity. The decisive victory of Germany in this war resulted in the downfall of the French Empire and in the establishment of the Third Republic. Napoleon was captured at Sedan (Sept. 2, 1870), and after the conclusion of peace he sought refuge in Kent, England, where he remained until his death. His only child, Prince Eugène Louis Jean Joseph, was killed in South Africa at the age of 23.

Narcissus, *Nar sis' us,* in Greek legend, handsome son of the river god, Cephissus. He fell in love with his reflection in a stream. Pining away from this fruitless passion, he was changed, at length, into the flower that bears his name. This was in punishment for his having repulsed various nymphs and maidens, notably, Echo.

Narcissus, or **Poet's Narcissus,** a handsome cultivated plant of the Amaryllis Family, loved for the stately

beauty of the flowers. The plant is practically stemless, for the flower stalk and the long, narrow leaves arise directly from a coated bulb. The flowers are borne singly upon the stem and are generally white, but above the six-parted corolla is a crown, which may be golden, crimson or only slightly marked. The edges of the crown are wavy and delicate and within its cup are the six golden stamens. The narcissus has a delicious fragrance and is a favorite greenhouse plant; many variations have been produced by floriculturists. Its name is taken from the legend of the youth, Narcissus, who so admired his own reflection in the stream that he was changed into the flower bearing his name.

NARCISSUS

Narcotic, *Nar kot' ik,* a term applied to any drug which, when given in small doses, relieves pain, induces sleep and diminishes susceptibility. Large doses sometimes produce stupor, unconsciousness or convulsions and result fatally. Some narcotics, such as tobacco and alcohol, have the effect of temporarily stimulating the nerves, but continued use of them causes those organs to break down from overexertion. Belladonna, opium and cocaine are among the best examples of narcotics.

Nar"ragan'sett Bay, an inlet of the Atlantic Ocean, extending along the eastern coast of Rhode Island. The largest islands it contains are the Conanicut, the Rhode Island and the Prudence. The principal ports are Newport at its entrance and Providence at the head of the bay.

Narvaez, *Nar vah' athe,* **Pánfilo de** (about 1478-1528), a Spanish warrior. In 1501 he went to Santo Domingo and thence to Cuba, and as chief lieutenant to Velásquez, attempted to supersede Cortez in Mexico, but failed. In the summer of 1527 he sailed from Spain to conquer Florida. Being detained in Cuba, he left that place in 1528, and, landing at Tampa Bay in April, claimed the surrounding country for Spain. His cruelty to the natives resulted in his being betrayed by Indian guides. He finally put to sea, but after cruising about the Gulf for months his company was destroyed.

Narwhal, *Nahr' hwal,* a large Mammal of the Dolphin Family, inhabiting the Arctic and northern Atlantic oceans. It is distinguished from other members of the family by having no dorsal fin. The males are further differentiated by the presence of a long, twisted tusk which proceeds from the upper jaw and is used as a weapon of defense; very infrequently a two-tusked variety is found. The narwhal is gray above and white underneath; it is among the largest of the dolphins, occasionally attaining a length of 20 ft. The flesh is prized by the Eskimo and the tusk yields a superior quality of ivory. See DOLPHIN.

Naseby, *Naze' by,* **Battle of,** a battle between the army of Charles I of England and the Parliamentary force of Cromwell and Fairfax, fought June 14, 1645. Charles's army was completely defeated. The battle takes its name from the parish of Naseby in Northamptonshire, where the engagement occurred.

Nash'ua, N. H., a city and one of the county seats of Hillsboro Co., 14 m. n.w. of Lowell, 33 m. s.e. of Concord and 38 m. n.w. of Boston, on the west bank of the Merrimac River, at the mouth of the Nashua, and on several divisions of the Boston & Maine Railroad. Electric car lines also connnect the city with Boston, Concord, Manchester, Lowell, Hudson, Litchfield, Tyngsboro, Pelham, Dracut and other cities and towns. The city is in the midst of a beautiful hill country. The extensive water power is obtained from the Nashua River and Salmon Brook by means of a canal three miles long and eight feet deep. The city contains a United States fish hatchery, a public library, Federal Building, courthouse, state armory, soldiers' monument, two academies, two hospitals and a number of large churches. Nashua is actively engaged in manufacturing and is noted for its large cotton mills. There are manufactories of boots and shoes, stationary engines, refrigerators, sash and blinds, ice-cream freezers, carpets, cards, glazed paper, hardware, iron and steel products, saddlery, shears, clippers, edge tools, undertaking supplies and furniture.

Nashua is one of the oldest interior settlements of the state. When the boundary between Massachusetts and New Hampshire was settled in 1741, this portion of territory was transferred to New Hampshire. In 1746 it was incorporated as a village under the name of Indian Head. In 1836 the name of Nashua was adopted. The first stagecoach was run through here from Boston to Amherst in 1795. The first cotton mill was erected in 1825. Nashua was granted a city charter in 1853. Population in 1920, 28,379.

Nash'ville, Tenn., the capital and county seat of Davidson Co., situated in the central part of the state on the Cumberland River, 186 m. s.w. of Louisville and about 475 m. n.e. of New Orleans. It is on the Louisville & Nashville, the Tennessee Central, the Nashville, Chattanooga & St. Louis and other railroads, and is connected by interurban lines with adjacent cities and points of interest. Seven bridges cross the river, and the local street-railway system is excellent.

Streets, Boulevards and Parks. The undulating hills and the broad curving river form a picturesque setting for this beautiful Southern city. Within its limits are nearly 300 m. of paved streets, lined with some of the wealthiest homes of the South and with modern business blocks. There are 13 of these macadamized streets, which radiate from the city and are highways of traffic that reach far into the surrounding country. The park system is extensive and includes Glendale Park, a place of great natural beauty; Centennial Park, established in 1897 to commemorate the admission of the state into the Union; Shelby Park, fronting the river; Watkins, Cherokee, Richland, Greenwood, and State Fair Grounds, where the annual state fairs are held. Together the parks and parkways occupy over 700 acres of ground.

The cemeteries of Nashville are beautifully situated and excellently cared for. Mt. Olivet cemetery has the graves of 2000 Confederate soldiers and a fine monument in their honor. The National cemetery lies north of the city and has the graves of over 16,000 Federal soldiers, the names of many of whom will never be known.

Public Buildings. The most conspicuous of the public buildings is the state capitol, situated on an elevation which makes it overtop neighboring buildings; its grounds are attractive with shrubbery, walks and statuary. Among the many other interesting buildings are the public art gallery in Centennial Park, housed in a building that is an exact replica of the Parthenon; the History Building in

the same park and, in general, resembling the Erectheum; the county courthouse; a Carnegie library; the United States Custom-House; a large union station; the state penitentiary; the governor's mansion, owned and reserved by the state as the home of the governor; and many beautiful churches, including a fine cathedral. Among the buildings owned by various organizations of the city are the Masonic Temple, new Y. M. C. A. and Y. W. C. A. buildings, the Young Men's Hebrew Association Building and the homes of the Elks', the Eagles', the Hermitage, the Standard Country, the Golf, the Commerce and the Country clubs. There is a St. Thomas Infirmary and excellent hospitals. Not far out from the city are The Hermitage, the old home of Jackson; and Belle Meade, once the home of Secretary of War Dickinson and now noted as the place where famous trotters are bred. The ruins of Ft. Negley, built during the Civil War, are on the summit of a near-by hill. The former home of President Polk has been replaced by a modern apartment house, known as Polk Flats.

Educational Institutions. Nashville is one of the foremost educational centers of the United States and has more than 50 institutions of learning aside from its excellent public schools. Among its notable schools are Vanderbilt University, named in honor of Cornelius Vanderbilt; the University of Nashville, now also including the George Peabody College for Teachers; the medical and dental departments of the state university; Ward Seminary, Buford, Boscobel, Belmont and Radnor colleges; Walden University, Roger Williams University, and Fisk University for negroes; a state school for the blind; a new high school and several Catholic schools and business colleges. Peabody College has a historical interest in that its main building was occupied as a barracks by the Federal troops during the Civil War.

Chief Industries. The many railroads and the excellent facilities for navigation, combined with the natural wealth of the surrounding country, have made Nashville an important commercial center. It has a large retail and jobbing business, and its flour mills make it one of the great milling cities of the United States. The encircling forests produce oak, poplar, chestnut, hickory and ash, and woodworking, lumbering and the manufacture of flooring and furniture are important. Its other factories produce automobiles, boots and shoes, baking powder, stoves, fertilizers, iron beds, electrical fixtures, snuff, harness, boxes, trunks, clothing, bags, drugs, dustless furnaces and many other articles. The city is also a noted market for live stock.

History. Nashville was settled by a company of pioneers under the leadership of James Robertson, and was named Nashborough in honor of Governor Nash of North Carolina. When incorporated in 1784, the name of the town was changed to Nashville. It became a city in 1806 and the capital of the state in 1843. In the Civil War, Nashville was Confederate until 1862, when it was captured by the Union troops. The Battle of Nashville was fought between the armies of Thomas (Union) and Hood (Confederate) in 1864, but left Nashville in possession of the Union troops. Nashville has had a steady growth and is one of the foremost southern cities. It has a commission form of government and owns its own waterworks and electric-lighting plant. Population in 1920, U. S. Census, 118,342.

Nashville, Battle of, an important engagement of the Civil War, fought at Nashville, Tenn., Dec. 15 and 16, 1864, between 50,000 Federals under Thomas and 26,000 Confederates under Hood, including cavalry under Forrest. Three months previous Hood had evacuated Atlanta and, by marching northward, had hoped to prevent Sherman's proposed march to the sea. Realizing Hood's purpose, Sherman had sent Thomas to Tennessee to deal with him, and Hood had followed Schofield to Nashville, where Thomas held the main army in the heights within and immediately sur-

rounding the city. Arriving before Nashville on Dec. 2, Hood challenged to battle; but Thomas waited two weeks, during one of which both armies were ice-bound. He was threatened with removal for this delay, and Grant became so impatient with him that he set out for Nashville in person.

Finally, Dec. 15, Thomas came out from behind his intrenchments, and after a two days' fight the Confederates were almost surrounded, and forced to a retreat which soon became a rout. At Brentwood, about four miles distant, the troops were somewhat collected, encamping there for the night; but the Confederate Army of the Tennessee was never again organized, and Hood asked to be relieved of his command. This was one of the most brilliant victories of the war, and destroyed the power of the South west of the Allegheny Mountains. It is agreed that the tactics employed by Thomas at Nashville were perfect, and his plan is the only one of the Civil War now studied as a model in European military schools.

Nast, Thomas (1840-1902), an American caricaturist, born in Landau, Germany. His family moved to the United States when he was six years old. When he was but 14 years of age he became a draftsman on *Frank Leslie's Illustrated Newspaper*. In 1860 he went to England and to Italy, and followed Garibaldi, making sketches of his war, which appeared in the *New York Illustrated News, The Illustrated London News* and *Le Monde Illustré*. In 1862 he began making war sketches for *Harper's Weekly*, and in 1872 began the publication of *Nast's Illustrated Almanac*. He illustrated *The Tribute Book*, Nasby's *Swinging 'round the Cerkle*, Dickens' *Pickwick Papers* and other works. He was the originator of the Republican elephant, the Democratic donkey and the Tammany tiger. In 1894 he was connected with the *Pall Mall Magazine*. In 1902 he was appointed consul-general to Guayaquil by President Roosevelt. His pictorial satire did much to correct many gross evils in public life, and was largely instrumental in breaking up the Tweed Ring of New York City. He also produced some very good oil paintings.

Nasturtium, *Nas tur' shum*, a common ornamental plant of the Geranium Family, planted along flower borders or near walls and fences. In the United States there are two common varieties whose chief difference is that one is a short, creeping or prostrate herb, while the other climbs sometimes to great height. The stems of the nasturtiums are slender and have a biting, pungent juice which makes them popular in salads and as a garnish. The leaves are thin, light green in color and almost circular in form, with the stem joining them near the center. The flower is made up of five irregular petals, the two upper being somewhat apart from the three lower and continued below the calyx in a long, hooked claw. These flowers are showy and are produced in all shades of yellow, orange and pure red or in mottled or striped variations. Its globular, seedy pods are pickled and used as a substitute for capers. Horseradish is technically known as nasturtium. The nasturtium is a native of Peru, where it grows abundantly in the woods and fields.

Natal, *Na tahl'*, since 1909 a province of the South African Union. See SOUTH AFRICA, UNION OF.

Natchez, *Nach' ez*, **Miss.,** a city and the county seat of Adams Co., about 100 m. s.w. of Jackson, on the Mississippi River and on the St. Louis, Iron Mountain & Southern, the Yazoo & Mississippi Valley, the New Orleans & Northwestern and other railroads. Steamboats connect the city with the entire Mississippi Valley, and an extensive commerce is carried on. Cotton, which is cultivated on a vast scale in the surrounding region, is the leading article of export, approximately 100,000 bales being shipped annually. Among the manufactures are cotton goods, cottonseed oil and cake, yarn, rope, brick, lumber products, drugs and ice. There is also a packing plant. Natchez was the first city in the state to own a municipal sewerage system and waterworks. Prominent among

the institutions of the city are the Natchez Institute; Stanton College (nonsectarian) for girls; St. Joseph's College for girls; the Natchez College for negroes; and, six miles from the city, the Jefferson Military College. The Fisk Public Library, orphanages, hospitals and sanatoriums are important; and Institute Hall, Natchez Hotel, the courthouse, clubhouses and numerous churches and antebellum residences are also worthy of mention.

There are four public parks, three on the river, and Memorial Park of 600 acres in the heart of the city, which is a memorial to Confederate dead. Adjoining the city is a National cemetery. A short distance from the city limits is the former estate of Winthrop Sargent, the first governor of the Territory of Mississippi. At Natchez the festival of Mardi Gras is held annually. The first white settlement on the site of Natchez was made in 1716, when Le Moyne de Bienville built Ft. Rosalie. This fort was destroyed and the inhabitants massacred in 1729. It was rebuilt and renamed Ft. Panmure by the English, who took possession according to the terms of the Treaty of Paris. In 1779 the Spanish took possession and in 1798 the United States dispossessed Spain of it. From 1798 to 1802 and from 1817 to 1821 Natchez was the capital of Mississippi. It received a city charter in 1803. The city was visited by a destructive tornado in 1840. It was shelled by Commodore Porter in 1862, and soon after the fall of Vicksburg fell into the hands of the Federals, who occupied it until the close of the war. Population in 1920, U. S. Census, 12,608.

Na'tick, Mass., a town of Middlesex Co., including several villages, 17 m. s.w. of Boston, on the Charles River and on the Boston & Albany branch of the New York Central Railroad. There are extensive manufactories of baseballs, woodenware, clothing, boots and shoes, edge tools, supplies for athletic games, saws, shirts and other articles. The educational institutions include the Morse Institute, the Walnut Hill School for young ladies and the Bacon Library. The place was founded by John Eliot about 1651, and from that time until the founder's death was used chiefly as a home for converted Indians. It was incorporated in 1781. Population in 1920, 10,907.

National Academy of Design, a society of artists in New York City. Professor Morse, the inventor of the telegraph, became its first president in 1828. Membership is limited to artists, and in number does not exceed 100. Instruction is offered in designing, painting, etching, still life and allied subjects. Annual exhibitions are held and prizes offered for work of artistic value.

National Academy of Sciences, an organization for the purpose of furthering scientific experimentation and research. It was incorporated under act of Congress in 1863 and, when required, acts as an advisory body on scientific matters to the government. It meets semiannually, and medals are awarded for excellence in original work.

National Banks. See BANKS AND BANKING.

National Civic Federation. See CIVIC FEDERATION, NATIONAL.

National Conventions, in the United States, political conventions at which the candidates for president and vice-president are nominated. The convention also adopts a set of resolutions, which constitute the platform of the party for the campaign that follows. National conventions are held once in four years and consist of delegates from all the states and territories, each state being entitled to twice as many delegates as it has representatives and senators in Congress. In most states the delegates consist of delegates at large and district delegates. Each state has as many delegates at large as it has senators and representatives at large in Congress. These delegates are chosen by party state conventions. The delegates from congressional districts are chosen by district conventions called for that purpose. As many alternates as delegates are chosen, so that the state may be sure of full representation if any delegate fails to attend.

The organization of the convention is in the hands of the national committee of the party, consisting of one member from each state and territory. Fully six months before the convention is to be held, this committee meets in Washington, selects the place of meeting and makes all other necessary arrangements. At the time of meeting it is also the duty of this committee to decide all contested elections and name the temporary chairman who shall call the convention to order. The selection of a permanent chairman and the necessary clerks or secretaries follows. Then committees are appointed, the most important being the committee on resolutions, which prepares the platform, and the committee on credentials. The convention then adjourns until the committees have prepared their reports. After the adoption of the platform the candidates are nominated and the convention adjourns.

The national convention of today is the outgrowth of the caucus system, which was instituted in the early political history of the country and which was finally employed by the members of Congress to nominate each party's candidate for president and vice-president (See CAUCUS). The national convention is the climax in a series of movements having for their purpose the nomination of party candidates for office, beginning with candidates for local offices, such as township officials, the county and ward officials in the city, and extending from these local centers to the county, the congressional district and the state. Each township and voting precinct in a city has its local party committee. In most states these local committees nominate delegates to their respective county conventions. The county convention, in turn, nominates delegates to the state convention and to its congressional district convention. It also nominates the candidates for the various county offices. The congressional district convention nominates a candidate for representative in Congress, and in most states the delegates to the national convention. The state convention nominates the candidates for state officials and the delegates at large to the national convention. At their meeting at the national convention the delegates from each state choose a member of the national committee for that state, and this national committee attends to calling the next national convention. See ELECTORAL COLLEGE; PRESIDENT; PRIMARY; POLITICAL PARTIES IN THE UNITED STATES.

National Democratic Party. See POLITICAL PARTIES IN THE UNITED STATES, subhead *Democratic Party.*

National Education Association, an organization of teachers formed in Philadelphia in 1857 as the National Teachers' Association. The organization has grown rapidly since 1870. It was incorporated in 1886 and now maintains about 20 departments, besides the National Council, which acts as an advisory board. The general association holds an annual meeting in July, and the Department of Superintendents holds its annual meeting in February. At the general meeting all departments except that of the superintendents hold meetings. The association publishes an annual report, which contains the proceedings of all the meetings. There are two classes of membership, active and associate; only active members have the right to vote. The active membership numbers about 10,000, and the association is one of the most influential educational bodies in the world.

National Guard, the name given to the militia in France organized at the time of the French Revolution. In Paris the Guard had a membership of about 48,000, and it was estimated that there were over 4,000,000 members in France. The National Guard was defeated by Napoleon in 1795, but reorganized by him in 1805. It continued in existence until 1871.

National Guard of the United States. See MILITIA.

National Hymns. See HYMNS, NATIONAL.

National Museum of the United States, a museum established in Washington, D. C., containing some of the most choice collections of historic relics,

animals, plants and other natural objects, in the world. The collections have been secured by the government scientific expeditions, by exchange and by donations. They are housed in an elegant building erected for the purpose, near the Smithsonian Institution on the west side of the Mall. The museum is under the direction of the secretary of the Smithsonian Institution and in direct charge of an assistant secretary, who employs a staff of about 80 helpers. It contains the rarest collection of Indian relics in America. See SMITHSONIAN INSTITUTION.

National Republican Party. See POLITICAL PARTIES IN THE UNITED STATES, subhead *National Republican Party.*

National Road, a road built by the United States Government from Cumberland, Md., to Vandalia, Ill. It was authorized by act of Congress in 1806, and the original plan contemplated constructing the road only as far as the Ohio River. It was extended by subsequent appropriations, the last being made in 1838. This road was one of the first internal improvements undertaken by the government, and it was strongly opposed on the ground that the appropriation for it was unconstitutional. It is sometimes called the Cumberland Road.

Natural Bridge, a bridge formed by the action of water which wears away a soft rock under a layer of harder rock, thus forming an arch through which the stream flows. There are numerous natural bridges in the United States, but the one most widely known is in Virginia, which spans Cedar Creek about 125 m. west of Richmond. The arch has a span of 90 ft. in its broadest part and is 215 ft. high. Four natural bridges of enormous proportions have been discovered in the southern part of Utah. They exceed in size and grandeur any other natural arches in the world, each having spans of several hundred feet and of equal or greater height. These bridges are so located that they are not accessible to the traveling public.

Natural Gas, a gas stored in the earth under pressure and valuable for heating purposes. Natural gas occurs in porous rock, where it has been confined under pressure or in chambers enclosed by impervious rock. When wells are bored into one of these chambers or into a layer of porous rock containing gas, it rises to the surface with greater or less force, depending upon the pressure. Sometimes the pressure is so great that it is difficult to close the well so as to prevent waste. While natural gas is usually found in or near regions containing petroleum, it is occasionally found in regions at a distance from oil fields. It has been found in large quantities around Pittsburgh, Pa., in the southern parts of Ohio and Indiana, in the southeastern part of Kansas, in Texas, Illinois, South Dakota, Colorado, Missouri, California and a number of other states. In Canada it occurs in the southwestern part of Ontario and around Medicine Hat and Langevin in Alberta. It is also found around the Caspian Sea and in some places in Africa.

Natural gas is of great value as a fuel, especially in smelting ores and making glass, and its discovery around Pittsburgh and in Indiana led many manufacturers to locate in those regions, but the extensive use has nearly exhausted the supply there. It can be conveyed long distances by pumping through pipes, and it is conveyed to cities in this way and used for heating dwellings and for cooking purposes. With an ordinary burner it gives but little light, but produces a brilliant light when used with a Welsbach mantle. It has also become an important source of gasoline, which is obtained by a process of condensing gasoline vapor occurring in the gas. See PETROLEUM; GASOLINE.

Nat″uraliza′tion, the legal process by which an alien may become a citizen of the country of his adoption. In the United States naturalization confers all the rights and privileges of a natural-born citizen, except that a citizen by naturalization cannot hold the office of president. The power to grant naturalization papers is restricted to the United States Circuit and District courts, and other courts of record having a seal, a clerk

and jurisdiction in actions in law and equity in which the amount of the controversy is not limited. The process involves two steps, declaration and application, or petition.

Declaration. At least two years before his application for citizenship, the alien must appear before a court of record having jurisdiction over the district in which he lives and make a formal declaration under oath of his bona fide intention to become a citizen of the United States and to renounce allegiance to any foreign state or power, particularly the one of which he may be a citizen or subject. The declaration must give information covering his name, age, occupation and the time and place of his arrival in the United States. Declaration cannot be made by an alien under 18 years of age.

Application. Not less than two years after an alien has filed his declaration and after not less than five years of continuous residence in the United States, he may make application for citizenship to any one of the courts named above. This application must include his name, place of residence, occupation, date and place of birth, place from which he emigrated, the name of the vessel on which he arrived, the time when he made his declaration and the court before which it was made. If he is married, the application must give the name of his wife, the country of her birth and the place of residence at the time the application is filed. If he has children the date and place of birth and place of residence of each child living must also be given. The application must be signed by the applicant and be verified by affidavits of at least two witnesses who are citizens. The application must be accompanied by a certificate from the department of labor stating the time, place and manner of the applicant's arrival in the United States.

Before the applicant can become naturalized he must declare under oath that he is not a disbeliever in nor opposed to organized government, and that he does not belong to any organization or body of persons opposed to organized government, and that he is neither a polygamist nor a believer in polygamy. He must also be able to speak the English language and declare under oath in open court that he will support the Constitution of the United States, and must renounce any hereditary title of nobility which he may possess.

Children of Naturalized Citizens. The children of persons who have been fully naturalized, being under the age of 21 years at the time of the naturalization of their parents, shall, if dwelling in the United States, be considered as citizens thereof. Children of citizens of the United States born in foreign countries are considered citizens of the United States.

Minors. Any alien under the age of 21 years who has resided in the United States three years next preceding his arriving at that age and who has continued to reside therein to the time he may make application to be admitted a citizen, may, after he arrives at the age of 21 years and after he has resided five years in the United States, including the three years of his minority, be admitted a citizen, but he must make oath that for two years next preceding it has been his express intention to become a citizen.

Prohibitions. The laws of 1882 forbid the naturalization of Chinese, and the courts hold that naturalization cannot be extended to Japanese, Burmese, Hawaiians and Indians.

Suffrage Right. The right to vote is a state gift, while naturalization is a Federal right and is a gift from the Union, not of any one state. In nearly one-half of the states, aliens who have declared intentions may vote; in the others only citizens may vote.

All the principal nations of the world, with the exception of Turkey and Russia, have enacted laws providing for the naturalization of aliens.

Nature Study, that line of study which enables the child to become acquainted with its environment. As ordinarily pursued in schools, nature study includes lessons on plants, animals, birds,

insects, the atmosphere, water and the weather. Nature study differs from other branches in that it is not usually taught for a definite length of time and does not require the mastery of a specific amount of knowledge. Its purpose is rather to place the pupil in a sympathetic attitude toward plant and animal life common to his locality and to train his powers of observation. The child studies not from books, but directly from the objects. Some of the work is done in the class under the immediate supervision of the teacher, but much is done out of the schoolroom, either in following the teacher's suggestions or under the stimulus of the child's own interests.

Nature study trains the powers of observation, leads the child to feel an ownership in, and have a love for, plants, animals, birds and insects, checks his tendency to destroy life, removes fear, prejudice and superstition concerning many living things and lays the foundation for the study of the various branches of natural science in the grammar grades and the high school. It originated with Pestalozzi and Froebel, and was urged upon the teachers of America by Horace Mann in the middle of the 19th century. It now constitutes a part of the course of study in both city and rural schools throughout the country. See KINDERGARTEN; MONTESSORI METHOD. Consult Hodge, *Nature Study and Life;* Schumaker, *The Study of Nature;* Payne, *One Hundred Lessons in Nature Study;* C. A. McMurry, *Special Method in Elementary Science.*

Nau'gatuck, Conn., a city of New Haven Co., 28 m. s.w. of Hartford and 5 m. s. of Waterbury, on the Naugatuck River and on a division of the New York, New Haven & Hartford Railroad. It is situated in an agricultural region and has considerable trade in farm products. There are manufactories of knit underwear, copper and brass goods, malleable iron, paper boxes and gas and electric fixtures. Large rubber works are located here. The city contains the Whittemore Memorial Library, Salem School, Sacred Heart Academy and Whittemore High School. Population in 1920, U. S. Census, 15,051.

Nautical Almanac. See ALMANAC.

Nau'tilus, a genus of marine animals related to the cuttlefishes. All species possess shells having a number of chambers, in the largest and newest of which the animal lives. As the nautilus leaves each succeeding chamber it forms a partition separating the old chamber from the new. A small opening through the partition connects all the chambers. It is supposed by some that the nautilus fills these with air or water so that it may rise or sink at pleasure. Other authorities do not agree with this opinion and hold that the nautilus never of its own accord descends below the surface. Most species are found in tropical seas. The paper nautilus, or argonaut, raises its arms above the water so that they look like sails, but they are used when in this position solely to secrete matter for the shell. See CHAMBERED NAUTILUS.

Nav'aho, or **Navajo,** *Nav' a ho,* a tribe of North American Indians belonging to the Athapascan family. They live in New Mexico and Arizona and number about 20,000. They have permanent dwellings, breed horses and sheep and raise many agricultural products. They are known chiefly for their skillful and artistic blanket weaving.

Na'val Academy, United States, a national school of the United States established in 1845 for the purpose of affording naval instruction. This school is located at Annapolis, Md., on the banks of the Severn River, at the site of old Ft. Severn. The grounds and buildings occupy 50 acres, and outside of these grounds is a park of 100 acres. The school was established by a special act of Congress at the suggestion of the historian, George Bancroft, who strongly urged the measure while he was secretary of the navy. The course requires six years, four to be spent at the academy and two at sea. A cadet has the rank of midshipman until he graduates, when he is given the rank of ensign. The course of study is very thorough in engineering and electrical and ordnance

work. Before graduating, the cadet must know English, French and Spanish, the Constitution of the United States and international law. During the last two years he is trained as an officer. Attendance at the Academy is determined by competitive examination of appointees of the president, two for each senator, two for each representative, two for each delegate in Congress, two for the District of Columbia, five for the United States at large and one for Porto Rico. The president or superintendent of the academy is a naval officer appointed by the secretary of war.

Naval Militia. See NAVAL RESERVE.

Naval Reserve, naval forces not in active commission in the navy which may be drawn upon in case of need. Ships of the naval reserve consist of those that are undergoing repairs, older and less efficient boats that may be of service, and such vessels as may be drawn from the merchant marine. The personnel of the naval reserve is made up of naval militia stationed at or near seaports, and consisting of about 4000 officers and men. The Spanish-American War called these naval-militia organizations out and proved them to be valuable. Since then there has been an effort to bring them into close contact with the regular naval service. Each battalion is furnished with a training ship where the militiamen are trained by their own officers. There are also many officers and men who have served in the navy and passed into civil life who may be depended upon to reenlist in time of war, and some men may also be drawn from the merchant marine. See NAVY.

Naval Schools of Instruction, schools for the training of the officers and men of a navy. These are maintained by all nations having any considerable navy. In the United States such schools are the Naval Academy at Annapolis (See NAVAL ACADEMY, UNITED STATES); the Naval War College at Newport, R. I.; the Torpedo School at Torpedo Station on Goat Island, Newport Harbor, R. I.; and others at Port Royal, S. C., San Francisco, Cal., and near Lake Bluff, Ill. In addition to these schools constant training is given on board all men-of-war. See NAVY; TRAINING SHIP.

Nav"iga'tion, the science and art of directing the course of a ship and of finding its position at sea. The navigation of a ship devolves upon the chief officer, usually a captain. Before leaving her dock every ship should be equipped with compasses, a set of mariner's charts, a sextant, a chronometer, leads for sounding and a log for measuring the distance traveled.

The position of the ship is found by two methods, known respectively as "dead reckoning" and "observation." On small bodies of water and on coastwise voyages where the land is constantly or frequently in sight, the ship's position is easily ascertained by observation of well-known objects on the shore, and "dead reckoning" answers every purpose. All courses are reckoned by reference to the north and south line of the compass, and "dead reckoning" consists in ascertaining the distance the ship travels each day and keeping a record of every change in the direction of her course. By comparing these records with navigators' tables, which give the reckonings for all latitudes, the ship's position can be quite accurately determined.

Reckoning by "observation" is employed in the open sea. It consists in measuring the position of certain heavenly bodies, particularly the sun, with the sextant, and from the positions thus ascertained determining the ship's latitude and longitude. The longitude is ascertained by comparing the sun time at noon on the ship with the time indicated by the chronometer, which on English and American ships is set to the time of Greenwich, England. The Nautical Almanac contains navigators' tables, by means of which the exact position of the ship can be determined after the measurements are made. By means of his chart the navigator then proceeds to lay out the ship's course for the next 12 or 24 hours. When entering or leaving large harbors, the ship is usually in charge of a pilot, and its course is fre-

quently marked by buoys. See BUOY; COMPASS, MAGNETIC; LIGHTHOUSE; SEXTANT.

Navigation Acts, the name applied to a series of acts passed by the British Parliament between 1645 and 1761 to safeguard English commerce, to injure the Dutch carrying trade and to exploit the British colonies for the benefit of English industry. The earliest navigation act to affect the American colonies, the so-called First Navigation Act, was passed in 1645, made more stringent in 1651 and further strengthened in 1660. This provided that all grown, produced or manufactured produce from any country whatsoever should be brought into England only in English vessels, thus making England the port for colonial staples. A supplementary act in 1663, the Second Navigation Act, was designed to maintain "a greater correspondence and kindness" between the colonies and the Mother Country, and provided that European goods should be shipped to the colonies from England alone and in British vessels. Chief among the few exceptions to this rule were wines from Madeira and the Azores, and salt for the New England fisheries. However, British merchants thus had a monopoly of the trade of the colonies in America. Subsequently duties were imposed upon goods sent from one colony to another if it were possible to secure the same goods in England.

As soon as the manufactures of the colonies began to grow, acts to suppress manufacturing interests were passed, and by 1719 Parliament had condemned colonial manufactures as having a leaning towards independence, while before 1761 some 29 individual laws had been made to curb colonial trade. Of these, one of the most annoying was the Sugar Act, 1733, which provided that sugar and molasses from the West Indies, from which the colonists made rum for exportation, should not be imported.

Owing to the widespread practice of smuggling, which the colonists considered legitimate, the full rigor of this repressive policy was never felt in America. Moreover, various provisions in the acts favored American industry, as the impetus to shipbuilding between 1772 and 1775 proved, while the American producers were granted many exclusive privileges. This commercial policy, however, was strongly denounced by the colonies, and British persistency in the matter was among the causes of the Revolutionary War. See REVOLUTIONARY WAR IN AMERICA.

Nav'iga"tors' Islands. See SAMOAN ISLANDS.

Na'vy, the warships of a nation taken collectively together with their crews and equipment. Warships were employed by the Greeks, the Phœnicians, the Persians, the Carthaginians and the Romans, among ancient nations. During the Middle Ages, carrying on war upon the water was common to nations having seacoasts. The Vikings in the North, and Genoa and Venice in the Mediterranean, prided themselves upon their navies and the management of their warships. The first warships were galleys propelled by oars, and ships of this style were the only ones used for several centuries. The use of the modern navy began when sails were substituted for oars.

UNITED STATES. The navy of the United States began with the Revolutionary War, when whaling ships and merchant vessels were armed and pressed into service to prevent British ships from bringing supplies to the garrison in Boston. Before the end of the war Congress had 64 ships in service, and they captured or destroyed nearly 200 British ships. The only naval battle of note between American and British ships was that between the *Bon Homme Richard* and the *Serapis* (See JONES, JOHN PAUL). In the war of 1812 the American navy was a credit to the nation and a surprise to Europe, American ships being successful in a majority of their encounters with the British. Between the War of 1812 and the Civil War there was little demand for a navy; hence at the beginning of the latter conflict numerous warships and gun-

boats were hastily constructed to assist the regular ships of the line. Between 1853 and 1860, France and England constructed a few ironclad warships, but there had been no opportunity to test them in battle. In 1861 the United States Government authorized the construction of ironclad ships for coast defense, and the *Monitor*, launched Jan. 30, 1862, was the first of these ships. On March 8 following, the *Monitor* met the Confederate ironclad *Merrimac* in Hampton Roads, Va., and these ships fought the first battle between ironclad ships in the world (See HAMPTON ROADS, BATTLE OF). After that all great powers began to construct ironclad warships.

From the close of the Civil War until 1890, but little was done to strengthen the American navy, but since the latter date, remarkable progress has been made, as shown by the table accompanying this article. The personnel of the navy comprises over 57,000 officers and men. The president is commander-in-chief of the navy. Tactics and strategical matters are in charge of the general board, at the head of which is the admiral. The navy is divided into the Atlantic, the Pacific and the Asiatic fleets. The Atlantic Fleet is divided into five divisions, the Pacific Fleet into two and the Asiatic Fleet into three. Each fleet is under the direct command of a rear-admiral, who is commander-in-chief of that particular division.

OTHER NATIONS. The other great navies of the world are those of Great Britain, Germany, France, Italy and Japan. The Russian navy, which was seriously depleted in the war with Japan, is being rebuilt. A Canadian navy is also under construction. See WARSHIP; NAVY, DEPARTMENT OF THE; NAVAL ACADEMY, UNITED STATES; NAVAL RESERVE.

The following table shows the comparative strength of the great navies of the world at the beginning of 1919:

Powers	Modern Battleships	Cruiser Battleships	Other Battleships	First-Class Cruisers	Second-Class Cruisers	Third-Class Cruisers	Gunboats	Monitors	Destroyers	Torpedo Boats	Submarines	Tonnage
Great Britain	55	9	15	24	42	34			369	34	140	2,273,781
Germany	36	1	10	29	14	30	49		173	101	116	826,637
United States	39		9	8	3	14	21	10	105	105	84	1,032,792
France	18		9	18	11	10	14		65	79	58	594,197
Japan	13	7	4	12	7	13	6		65	24	16	618,039
Russia	13	12	3	6	8	2	8		100	25	44	400,265
Italy	11	5	2	7	3	15	13		47	96	78	315,977

Navy, Department of the, a department of the United States Government organized in 1798 and having charge of the navy and all affairs pertaining to it. The secretary of the navy, a civilian, is at the head of the department, and he is assisted by an assistant secretary, also a civilian. The secretary is appointed by the president and confirmed by the Senate. He is a member of the cabinet and serves during the pleasure of the president, who is commander-in-chief of the navy. The department is organized into a number of bureaus, each having charge of special lines of work. The most important of these are the bureau of yards and docks, the bureau of navigation, the bureau of ordnance, the bureau of construction and repair, the bureau of steam engineering and the bureau of medicine and surgery. The larger bureaus are divided into departments. The Hydrographic Office, the Naval Observatory and all

naval schools are under the supervision of the navy department.

Navy Yard, a place for anchorage, repair and construction of warships and naval supplies. Navy yards are maintained by the government. Those in the United States are at New York, Boston, Norfolk, Va., Portsmouth, N. H., Philadelphia, Mare Island (near San Francisco, Cal.), Washington, D. C., and Bremerton, Wash. A navy yard usually contains repair shops, storehouses and a dry dock. The largest dry docks in the United States navy yards are at the New York and Norfolk yards.

Naz'arite, the name given by the Jews to one who devoted himself in a special sense to the service of Jehovah. Among the ancient Jews there were two classes, Nazarites for life and Nazarites for a limited period, the latter being subject to the law contained in *Numbers vi:1-21.* Abstinence from wine and allowing the hair and beard to grow were obligatory during the fulfillment of the Nazarite's vow. The Old Testament Nazarites for life were Samuel and Samson.

Nebras'ka, THE TREE PLANTER STATE, one of the West North Central States, is bounded on the n. by South Dakota, on the e. by Iowa and Missouri, on the s. by Kansas and Colorado and on the w. by Colorado and Wyoming. The Missouri River forms about one-third of the northern and all of the eastern boundary.

SIZE. The greatest length from east to west is 450 m., the breadth is 208 m. and the area is 77,520 sq. m., of which 712 sq. m. are water. Nebraska is about the size of Ohio and Indiana combined, less than one-half the size of California, almost exactly the size of South Dakota and the 15th state in area.

POPULATION. In 1920 the population was 1,296,372. From 1910 to 1920 there was a gain in population of 104,158, or 8.7 per cent. There are 16.9 inhabitants to the square mile and the state's rank in population is 31.

SURFACE. Nebraska extends from the Missouri River to the foothills of the Rocky Mountains and belongs to the Great Plains region of the United States. The surface in general is that of a rolling prairie sloping gently to the eastward. Through this prairie the rivers have worn deep channels. The lowest point, 842 ft., is in the southeastern corner and the altitude of the eastern third averages about 1000 ft. Along the western border the altitude varies from 3000 to 5000 ft. Wild Cat Mountain, 5038 ft., in Banner County, is the highest point in the state. North of the North Platte, Pine Ridge, a range of low mountains, extends east and west, and in the northwest corner is a section of the Bad Lands, which are more prominent in South Dakota. This region is characterized by ravines and gorges bordered by cliffs and peaks that have been worn into fantastic shapes. It is of great interest to geologists on account of the fossils it contains.

RIVERS. Most of the state is drained directly into the Missouri. The Niobrara flows almost across the state from west to east and enters the Missouri in Knox County. The Elkhorn drains the northeastern part, and the Loup with its tributaries the northern. The North Platte enters the state about midway between its northern and southern boundaries, and flows southeast to join the South Platte, which enters the state from Colorado. The Platte, the largest stream within the state, flows across the south-central part and enters the Missouri between Sarpy and Cass counties. The Republican drains the southwestern part into Kansas, and the Blue, also flowing into Kansas, drains the southeast corner. Some of the streams lose all or most of their water by seepage during the dry season. Water-bearing rock and gravel underlie the hillsides, and artesian wells are obtained by boring into these strata. The wells usually have a strong flow and provide abundant water for domestic purposes and for irrigation.

CLIMATE. Nebraska has a mild temperate climate. The atmosphere is clear, dry and bracing and the winters are

mild, with occasional cold spells when, in the northern part of the state, the thermometer may fall as low as 20° below zero. But the bright sunny days relieve the severity of the temperature. The summers are warm with numerous hot days in which the thermometer may rise to 100°. The nights, however, are cool and the summers are as a whole salubrious. The mean temperature for January is 21.5° and for July 74.5°. The annual rainfall varies from 30 inches in the eastern part of the state to 20 and 15 inches in the western part, with an average of 24 inches for the entire state.

MINERALS AND MINING. Limestone is extensively quarried for building and other purposes. In the production of potash, Nebraska is the leading state. Clay suitable for brick is found in many localities and rock valuable for cement is widely distributed. Sand of excellent quality for making cement rock is shipped in large quantities, and in the southern part of the state are valuable deposits of ocher.

AGRICULTURE. Only one-half of the state is adapted to agriculture without irrigation and the remainder is suited to grazing. Agriculture is the leading industry and furnishes occupation for by far the greater number of inhabitants.

Soil. The soil is generally a loam underlaid with sand and gravel. That along the river beds contains a large proportion of alluvium. With the exception of small areas in the north and northwest the soil is fertile, and when supplied with water yields abundant crops.

Products. Corn is the leading crop with an average yield of about 250,000,000 bushels. Wheat is next in importance, with a yield of about 50,000,000 bushels. Both winter and spring wheat are grown, but winter wheat is the more successful. Oats and rye follow wheat in order of value. Hay, sorghum, broom corn, millet, alfalfa and sugar beets are all important crops, and garden vegetables are raised in large quantities in some localities. Apples, plums, cherries, peaches, grapes and small fruits are raised successfully, and fruit culture is rapidly increasing.

Live stock is raised throughout the state, but this branch of the agricultural industry receives relatively greater attention in the western part of the state because of the adaptability of this region to grazing. Large numbers of horses, mules, cattle, sheep and hogs are raised for Eastern markets. The state has over 2,000,000 horses and mules and over 3,000,000 sheep. Dairying is an important industry and the total income from dairy products exceeds $50,000,000 a year. The income from poultry and eggs is also about $50,000,000. In some parts of the arid regions there are large irrigation systems and more than 1,000,000 acres are under cultivation. With the extension of irrigation works along the Niobrara River another large section of the state will have its fruitfulness materially increased.

MANUFACTURES. Slaughtering and meat-packing, having its center at South Omaha, is the chief manufacturing industry, and this city ranks third in the country as a meat-packing center. Next in importance is the manufacture of flour and gristmill products. The manufacture of starch, making cars and railway appliances, canning fruits and vegetables, the manufacture of beet sugar and making butter and cheese are all important and growing industries.

TRANSPORTATION AND COMMERCE. Nebraska has over 10,000 m. of railways. Great trunk lines extend across the state from east to west and these are connected by numerous cross lines running north and south. The leading systems are the Chicago & North Western, the Union Pacific, the Burlington & Missouri, the St. Paul, Minneapolis & Omaha and the Rock Island. Interurban systems are found in the larger cities. Omaha and Lincoln are the chief railway centers.

Live stock, flour, corn, wheat and other agricultural products and packed meats are sent to the Eastern markets in

large quantities and manufactured goods and foodstuffs not raised within the state are imported.

GOVERNMENT. The present constitution was adopted in 1875. The initiative and referendum have since been approved as a part of the constitution. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, superintendent of public instruction, attorney-general and commissioner of public lands and buildings, all elected for two years. The Legislature consists of a Senate of 33 members and a House of Representatives of 100 members. The members of both houses are elected for two years. Sessions are held biennially and are limited to 90 days.

The judicial department consists of a Supreme Court of seven judges elected for six years; District Courts for the 26 judicial districts into which the state is divided, and in each of which a judge is chosen for four years; and County Courts, which have probate and limited criminal and civil jurisdiction. County judges are elected for two years.

EDUCATION. The public school system is under the direction of a state superintendent of public instruction, and the schools in each county are under the supervision of a county superintendent. The schools are very efficient and the percentage of illiteracy is low. The state normal schools are at Peru, Kearney, Chadron and Wayne. The state university and agricultural college is at Lincoln. The University of Nebraska is at the head of the educational system. The higher institutions not under the control of the state are Bellevue College at Bellevue; Cotner University at Lincoln; Doane College at Crete; Fremont Normal College at Fremont; Creighton University at Omaha; Nebraska Wesleyan University at Lincoln; Grand Island College at Grand Island; and Nebraska Normal College at Wayne.

STATE INSTITUTIONS. The hospitals for the insane are at Lincoln, Norfolk and Hastings. The school for the deaf is at Omaha, that for the blind at Nebraska City and the institution for the feeble-minded is at Beatrice. The soldiers and sailors' homes are at Milford and Grand Island, and there is a home for friendless children at Lincoln. The state penitentiary is at Lincoln, there is an industrial school for boys at Kearney, one for girls at Geneva and an industrial home at Milford.

CITIES. The chief cities are Lincoln, the capital; Omaha, South Omaha, Fremont, Grand Island, Nebraska City, Beatrice and Hastings.

HISTORY. Nebraska, named from the Indian "shallow water" (the Platte), was probably visited by Coronado in 1541. It came to the United States by the Louisiana Purchase, and Lewis and Clark explored it in 1804. The first permanent white settler located at Bellevue in 1824. Nebraska City was settled in 1847; Omaha in 1854. After a long struggle, mainly over slavery (See KANSAS - NEBRASKA BILL), Nebraska Territory was organized. It included parts of Dakota, Montana, Wyoming and Colorado. Having been reduced to its present dimensions in 1863, it became a state in 1867. Occasional Indian troubles have been the only interruption to its growing prosperity. Consult Barrett's *History and Government of Nebraska.*

GOVERNORS. David Butler, 1867-1871; W. H. James, 1871-1873; Robert W. Furnas, 1873-1875; Silas Garber, 1875-1879; Albinus Nance, 1879-1883; James W. Dawes, 1883-1887; John M. Thayer, 1887-1891; James E. Boyd, removed; John M. Thayer, 1891-1892; James E. Boyd, 1892-1893; Lorenzo Crounse, 1893-1895; Silas A. Holcombe, 1895-1899; William A. Poynter, 1899-1901; Charles H. Dietrich, 1901; Ezra P. Savage, 1901-1903; John H. Mickey, 1903-1907; George L. Sheldon, 1907-1909; A. C. Shallenberger, 1909-1911; Chester H. Aldrich, 1911-1913; John H. Morehead, 1913-1917; K. Neville, 1917-1919; S. R. McKelvie, 1919—.

Nebraska, University of, at Lincoln (1869). This institution is governed by a board of six regents. It has a fine

library containing 140,000 volumes. The total income is approximately $1,500,000 annually and there are more than 4500 students. By legislative enactment, the University comprises ten colleges: Graduate, Arts and Sciences, with the subsidiary School of Fine Arts, Engineering, Agriculture, Teachers, Business Administration, and the professions of Law, Medicine, Pharmacy, and Dentistry, all open to men and women alike and offering all the advantages of a full college education.

Nebuchadnezzar, *Neb" u kad nez' ar,* reigning about 605-562 B. C., the restorer of the Babylonian Empire, also noted for his great works of public utility. He secured the Medes as allies and devoted himself to regaining the lost provinces of Babylonia. Wearied at length by the repeated rebellions of the Jews, he destroyed Jerusalem (586 B. C.) and carried the inhabitants to Babylonia. He lavished money upon Babylon to beautify it, and also fortified it by a triple wall. Among his works were the Great Palace, the famous Hanging Gardens, and the quays along the Euphrates and the city walls.

Nebulæ, *Neb' u lee,* cloudlike patches of light in the sky. Two such luminous clouds are visible to the naked eye: one, the brightest, in Andromeda; and the other in Orion. Thousands of others are visible through the telescope. Some of the nebulæ are clearly resolved into stars by large telescopes; these are star clusters so far away as to appear merely as clouds of light to the naked eye or through small telescopes. Other nebulæ do not resolve into stars, but by the aid of the spectrum appear to be masses of luminous gas, some lines of the spectrum showing the presence of substances not yet discovered on the earth. The nebulæ have peculiar and various shapes; some of them are probably changing their forms, indicating movement within themselves, and suggesting the possibility that they may be new systems in process of formation. See STARS; ORION; TELESCOPE; SPECTRUM ANALYSIS.

Neb'ular Hy poth'esis, a theory advanced by Laplace, Kant and others to account for the formation of the solar system. The foundation of the theory is the supposition that the bodies comprising the solar system were once a nebulous mass; this mass took a rotary motion on its axis, from east to west; as the temperature diminished and the nebula contracted the rapidity of rotation increased and zones or rings of nebulous matter were separated. Each of these zones contracted into a spherical body forming a planet, which revolves in the orbit that the zone occupied. The planets in turn by rotation separated themselves from rings which became satellites, which in case of Saturn are still seen in the original form of the zone, constituting the rings of that planet.

In proof of the correctness of this theory its advocates claim that the orbits of the planets around the sun and the planes of their rotation upon their axes very nearly coincide; that the direction of revolution around the sun is the same for all planets except Uranus and Neptune; that the satellites of the planets, as a rule, also revolve around their respective planets in the same direction; and still further that the rotation of the planets and satellites on their axes is in this same direction; all of which suggests that millions of years ago the sun, at that time a cloud of gas, was pitched whirling into space, condensing and throwing off portions of itself as it whirled. The nebular hypothesis is not now so generally accepted as formerly. See ASTRONOMY; LAPLACE, PIERRE SIMON; NEWTON, SIR ISAAC.

Neck'er, Jacques (1732-1804), a French financier and statesman, born in Geneva. In 1747 he entered a Paris banking house as clerk, and in time amassed a large fortune as a banker. In 1777 he became director-general of finances, in which capacity he advocated reforms in the financial policy of the government and endeavored to fund the French debt. This won him many ene-

mies and finally forced his retirement to Switzerland. However, after the ministry of Calonne, the value of Necker's policy was recognized, and in 1788 he was recalled, only to be dismissed the following year. His removal caused an uprising, during which the Bastille was stormed, and though the banished minister was again recalled and accorded an ovation by the populace of Paris, he was not equal to the political or financial exigency, and resigned in 1790. Necker was the father of Madame de Staël. See STAËL-HOLSTEIN, ANNE LOUISE GERMAINE.

Nectarine, *Nek' tar in,* a variety of peach tree and, like it, a member of the Rose Family. It resembles the peach tree in form, size, leaves and blossoms but differs from it in bearing a smooth-skinned fruit. This fruit is also called nectarine and is sold upon the market with peaches, pears and plums. The tree grows in all small-fruit regions where the peach can be made to thrive.

Needle, a slender instrument of steel, having a point and an eye. It is employed in sewing fabrics, leather and other materials by drawing a thread through them. The most barbaric nations of which we have a history are known to have used some substitute of our steel needle. The American Indian employed awls and needles of bone and of copper to sew his leggings and moccasins. The steel sewing needle was probably first made by hand in Nuremberg, Germany, about 1370, and the industry was introduced into England about 200 years later.

Needles are now made exclusively of refined steel and by machinery requiring a very large number of operations. A fine, even-tempered, steel wire is selected, and this is furnished in coils from which a machine cuts off blanks the length of two needles. These are first straightened, after which they are carried on a moving belt, which rotates them and brings their ends against fast-revolving emery wheels, by which operation both ends are pointed. Another machine is employed to flatten these blanks in their middle and also to punch the eyes in them, after which they are cut apart and strung on wires in order to polish and finish the eyes. At each operation the needles are carefully inspected for defects. They are then sorted, polished, tempered, blued, counted and packed in papers, all by machines nearly automatic in operation. The process of making sewing-machine needles is practically the same, but different machines are used, owing to the position of the eye at the point. Making of the finest needles for hand sewing is confined principally to England and Germany, while the United States makes a very large number of the best sewing-machine needles.

Negau'nee, Mich., a city of Marquette Co., 3 m. e. of Ishpeming and about 12 m. s.w. of Marquette, in the northern part of the Upper Peninsula. The Chicago & North Western, the Duluth, South Shore & Atlantic and other railroads enter the city. The town, located on a ridge called Iron Mountain, is over 1400 ft. above sea level and overlies some of the most valuable iron-ore deposits in the United States. Mining and the shipping of iron ore are the principal industries. Settled in 1870, Negaunee was incorporated in 1873 and chartered in the same year. Population in 1920, U. S. Census, 7,419.

Negligence, *Neg' li jens,* in law, the failure to do something which a reasonable person, guided by those considerations which ordinarily regulate the conduct of human affairs would do, or doing something which such a prudent and reasonable person would not do. The law recognizes three degrees of negligence: (1) *gross negligence,* representing a want of care amounting to recklessness; (2), *ordinary negligence,* the absence of such care as would be ordinarily exercised by a prudent person; and (3), *slight negligence,* standing for the lack of care which is required of one who is doing a favor to the injured party. In case of suit for damages arising from negligence, the burden of proof rests with the plaintiff, and the

fact of negligence is decided by the jury. In case the party claiming damages contributes by his negligence to the injury, he cannot recover damages.

Negotiable, *Ne go' shi a b'l,* **Paper,** a written instrument or contract which is transferable by indorsement or delivery, and which is treated as a security for and representative of money. Not all *assignable* instruments are *negotiable.* Bills of lading, warehouse receipts and like documents are assignable, but represent goods, not money; and their transference can carry only such title as is involved in the possession of the goods themselves. If such documents are stolen, for instance, the goods can be recovered by the rightful owner. The case is otherwise with negotiable paper, which represents money. When it is transferred, absolute title goes with it. The most common forms of negotiable paper are bills of exchange, promissory notes and bank checks (See BILL OF EXCHANGE; PROMISSORY NOTE; CHECK; DRAFT). There are also other forms, such as corporation and municipal bonds, exchequer bills and script for government bonds.

VALIDITY. No fixed form of words is necessary in writing negotiable paper, but it is usually made payable *to the order* or *to bearer.* If a note is made payable to a specified person and not to his order, it is not negotiable in form. The promise or order to pay must also be unconditioned, so that its clearness may not be in doubt. It must be a promisé to pay money, not goods, and a definite amount. The time of payment must be specifically fixed. A note must also be delivered in order to be valid; if made out and locked in a desk, it still belongs to the maker. A note is not valid unless the parties thereto are legally competent. A minor, for instance, cannot give a note that is binding.

HOW TRANSFERRED. Negotiable paper is transferred by *delivery* or by *indorsement.* If it is payable to the bearer, it may be passed freely by simple delivery from one party to another, and it belongs to the party who holds it at any given time. If it is made payable to the order of some party, however, it must be indorsed by that party before it is transferable. This is done by writing the name across the back of the document. The indorsement may either be *in blank,* by writing the name alone, in which case the paper then becomes payable to bearer; or, the person indorsing the paper may make it payable to some other party or his order, in which case this party must indorse it in turn, either in blank or to still another party, and so on. All of the indorsers are legally responsible for the payment of the paper, unless they indorse it "without recourse" or in some other qualified way. A paper may also be indorsed by an outside party as security, in which case he becomes legally liable for its payment.

PROTEST. If indorsed paper is not paid when due, it may be protested. This is a solemn declaration made in writing by a notary public, or by creditable witnesses, to the effect that when the paper was due it was presented to the parties liable for its payment, and that payment was not made. The object of the protest is to have proof that the parties to the instrument were duly notified and payment demanded of them.

Ne'gro, a dark-skinned race of men living in Africa. In a wider sense the term includes all the dark races of the subtropical and intertropical regions of the Eastern Hemisphere, but the Bantu group, Hottentots, Bushmen and Congo dwarfs are classed as negroids, and are thus distinguished from the pure negro type. The physical characteristics common to the negro are, the brown or black complexion, dark, woolly hair, broad, flat nose, thick lips and long skull.

The true negroes live in the Sudan. To the south of them are found the Bantu group, the Hottentots, the Bushmen and the Congo dwarfs. A great number of negroes live in the United

States and other parts of the civilized world, where their ancestors were brought from time to time in a state of slavery. See NEGRO, EDUCATION OF THE.

Negro, Education of the. Outside of the United States, the education of the negro has usually been of comparatively little concern to the white man. Where there were few negroes, their education constituted no special problem. During the period of slavery the negro gained much which formed the foundation of his advancement after emancipation. While, previous to their freedom, only a small number of the colored people learned to read and write, all learned the language of a civilized people and all acquired habits of industry, while a goodly number became skilled in such trades as carpentry and blacksmithing. Moreover, during the war, while their masters were in the army the management of the estates was left largely to the slaves, and through the responsibility thus thrust upon them they gained some knowledge of administrative affairs.

As the war progressed, the people in the North became interested in the education of the negroes. The missionary societies and churches were first in the field. In 1861 the American Missionary Society opened a school at Hampton, Va., which has since attained more than a national reputation (See HAMPTON NORMAL AND AGRICULTURAL INSTITUTE). The churches began to establish schools throughout the South, and by 1865 institutions supported by the various religious denominations were formed in all the states from Virginia to Texas. In 1865 the Freedman's Bureau was established by the government, and by 1870 it had expended more than $5,000,000 in providing schools and instruction for negroes.

At first the teachers were white men and women from the North, but as the movement progressed provision was made for educating and training negro teachers, and by 1878 over 25 normal schools and colleges were engaged in this work. Most of these institutions have continued to the present time and they have trained thousands of teachers for negro schools. When these schools were established, practically no attention had been given to industrial education in the United States, and it was natural that the founders of these schools should introduce into them the same courses of study that were found in similar schools in the North; hence many of the branches were impractical and wholly unsuited to the conditions which the students must face when they left school. The change to more practical courses was due to Gen. Samuel C. Armstrong, the founder and first president of Hampton Institute (See ARMSTRONG, SAMUEL CHAPMAN). It was in this institution that Booker T. Washington obtained his education and the inspiration which led him, in 1881, to establish the Tuskegee Normal and Industrial Institute. Through the work and influence of these two institutions, industrial education has been widely spread among the negroes of America.

Previous to 1870 there were no public schools for negroes, except in a few of the larger cities. The resources and property of the South had been destroyed by the war, and there were no funds for educational or other public purposes. As the states began to recover, however, public school systems, providing separate schools for white and colored children, were established. In every state the number of these schools has been increased and their standard raised with the increase of the public school fund. High schools and agricultural schools for colored youth are now maintained, making the educational advantages of the negroes equal to those of the whites. In their educational work the Southern States have been very materially assisted by the Peabody Education Fund, the John Slater Fund and the General Education Board. See SLATER FUND; PEABODY EDUCATION FUND; GENERAL EDUCATION BOARD; TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE; WASHINGTON, BOOKER TALIAFERRO.

Ne"hemi'ah, a book of the Old Testament, following *Ezra* and preceding *Esther;* also the name of the author of the book. Originally the book of Nehemiah was united with the book of *Ezra.* Nehemiah was a pious Jew who was made cupbearer to King Artaxerxes of Persia. In 445 B. C. he was sent as governor to Jerusalem, being commissioned to rebuild the walls and gates of the city. This task he accomplished in spite of many difficulties, besides inspiring the hearts of the people with the spirit of piety and enthusiasm. He revisited Jerusalem in 433 for the purpose of abolishing certain abuses that had crept in during his absence. The period covered by the book of *Nehemiah,* which chronicles these events, is of 13 years' duration, from 445 B. C. to 432 B. C. See BIBLE, subhead *The Old Testament.*

Nelson, a city of Canada in the Province of British Columbia, on the west arm of Kootenay Lake, on the Canadian Pacific and Spokane Northern railways, 82 m. s. of Revelstoke. There is steamer connection with Kootenay Landing, Kaslo and points up the Kootenay River. The city is surrounded by a fruit-growing district, has an important wholesale business and is the judicial center of Kootenay. Among the important buildings are hotels, schools and banks. The city contains cigar, box, sash and door factories, cement-block and brick plants, a smelter, a foundry, a machine shop, flour and saw mills, a tannery and a fruit-packing house. Population in 1911, 4476.

Nelson, Horatio, VISCOUNT (1758-1805), a celebrated British naval commander, born at Burnham-Thorpe, in Norfolk, England. He was practically deprived of schooling and entered the navy at the age of 12, where he came under the care of his uncle, who was captain of the ship. To this uncle, Nelson owed much for his thorough training in seamanship and for his rapid promotion. During his early service he made voyages to the East Indies and to the Arctic regions. Nelson was never physically strong, and he suffered much from ill health. At the age of 21 he became captain, but after that his promotion was slow because of the rule that promotion above captain must be according to seniority. In 1783 he was appointed to the command of the *Boreas* and served for the next four years in the West Indies, where he incurred the displeasure of his superior officer and certain vested interests because of his strict enforcement of the navigation laws. His acts, however, were finally approved by the British Government. In 1787 he was relieved from active service.

The war with France caused all officers of the British navy to be called into active service, and in 1793 Nelson was placed in command of the *Agamemnon,* a 64-gun ship and one of the best in the navy. His ship was assigned to the Mediterranean fleet. While in the Mediterranean, Nelson was sent on several diplomatic missions, and he took an active part in the conquest of Corsica, where he lost his right eye. In 1796 he was promoted to the rank of commodore. The success of Napoleon and his alliance with Spain rendered the position of the British fleet in the Mediterranean precarious, and the government decided to withdraw. In the movements that followed, Nelson performed distinguished service in securing to Great Britain all her property and avoiding collision with the Spanish fleet. He then rejoined Admiral Jervis and took a leading part in the battle with the Spanish fleet, Feb. 14, 1797, where by his skill and bravery he did much to win the victory. The Spanish fleet of 27 ships was totally destroyed, though the British fleet numbered but 15 ships. In July of the same year he made an attack on Santa Cruz or the Island of Teneriffe, but was repulsed and lost his right arm. On his return to England he was invested with the Order of the Bath and given a pension of £1000 a year.

In 1798 Nelson joined the Earl of St. Vincent and soon became recognized as

the ablest officer in the British navy. Napoleon's victories had placed England in a position standing alone against Europe. Should she meet with reverses on the sea her power would be practically lost. Napoleon sent his expedition to Egypt for the express purpose of injuring England. Nelson was ordered to follow. He found the French fleet and practically destroyed it, Aug. 1, 1798, in the Battle of the Nile. This compelled the French to return. For this victory Nelson was created Baron Nelson of the Nile. In 1801 he was promoted to be vice-admiral and on April 2 destroyed the Danish fleet in the harbor of Copenhagen and compelled the Danes to sign an armistice very favorable to England. In 1803 he was made commander-in-chief of the Mediterranean fleet, and for the next two years blockaded Toulon, but the French fleet escaped, and after a prolonged chase he blockaded the fleet at Cadiz. This was the occasion of the Battle of Trafalgar, which occurred Oct. 19, 1805. Before beginning the engagement Nelson gave his celebrated signal, "England expects every man to do his duty." The combined French and Spanish fleets were totally destroyed, but Nelson was mortally wounded and died two days later. He was buried in St. Paul's, London, with distinguished ceremonies. See TRAFALGAR.

Nelson, Wolfred (1846-), a celebrated physician, born in Montreal and educated at McGill and Lennoxville universities. He was a member of the College of Physicians and Surgeons, Province of Quebec, later successively practiced in Montreal, settled at Panama, where he served on the state board of health, spent four years collecting data on climatology and tropical disease throughout Mexico, Central and South America, the West Indies and Europe, and finally, in 1890, went to New York. Dr. Nelson, who has written extensively on travel and medical subjects, was for 15 years a regular correspondent of the *Gazette*, published in Montreal.

Nelson River, a river situated in Manitoba, Canada, rising in Lake Winnipeg. It flows northeast from the north end of the lake through a series of smaller lakes, emptying into Hudson Bay at York Factory. It is about 400 m. long. The mouth of the river is 710 ft. lower than its source, resulting in numerous cascades and rapids and rendering navigation difficult in its upper course, but it is navigable 125 m. from its mouth. The Nelson and the Saskatchewan form one of the four great river systems of the Western Divide, covering a distance of 1450 m. and draining a region of 360,000 sq. m. in area.

Nelum'bo. See LO'TUS.

Nem'esis, in classic mythology, an avenging goddess who meted out just punishment from the gods, especially to the haughty. By some authorities she is considered the daughter of Erebus and Night and by others the daughter of Zeus and Necessity. She is represented in art as a woman of queenly bearing, wrapped in a tunic. She was worshiped by the Greeks and Romans.

Nepal'. See INDIA.

Nep'otism, favoritism used by officials having appointing power to place their relatives in positions which pay good salaries. The practice, whether in government or business, is severely condemned because it tends to lower the standard of efficiency and encourages corrupt practices. The term comes from the Latin word *nepos*, meaning nephew.

Nep'tune, the outermost planet of the solar system, and eighth from the sun. Its distance is more than 2,500,000,000 m. from the sun. Its diameter is about 35,000 m., or more than four and one-half times the diameter of the earth; its day is unknown; its year about 165 of our years. Neptune is not visible to the naked eye, and is difficult to locate with the telescope. Its discovery in 1846 was the result of careful calculation on the part of astronomers who sought it to account for certain irregularities in the movements of Uranus. Neptune has one moon. On account of the distance, so far beyond the power of human com-

prehension, very little is yet known about this far wanderer through the stellar spaces, except that it shines with a pale blue light. See SOLAR SYSTEM.

Neptune (in Greek, Poseidon), in classical mythology, god of the sea, son of Saturn and Rhea, and brother of Pluto and of Jupiter, to whom alone he was second in authority. Neptune aided in building the walls of Troy, and when King Laomedon denied him the promised reward, he punished the people with a huge sea monster, which yearly demanded a beautiful maiden. It was finally killed by Hercules. The god of the sea was worshiped principally by the mari-

NEPTUNE

time Ionians, who sacrificed rams, boars and black bulls to him. He was usually represented as accompanied by a dolphin and as carrying a triple-pronged scepter. From his palace in the deep sea, he would drive out over the waves in a chariot drawn by brazen-hoofed and golden-maned horses. At his coming the waters were stilled.

NEREIDS

Nereids, *Ne' re ids,* sea nymphs, daughters of Nereus and Doris, in attendance on Neptune. According to various accounts they are 50 or 100 in number, human in appearance, or with green hair and the tails of fishes. They are often represented riding on sea monsters. See NYMPHS.

Ne'ro (37-68), a Roman emperor, son of Agrippina, the wife of the Emperor Claudius. His mother succeeded in poisoning Claudius and in placing her son Nero on the throne (54). He had a love for art and literature, and had acquired a taste for philosophy under his tutor, Seneca. During the early years of his reign he was under the influence of his mother, a capable but unscrupulous woman, and of Seneca and the faithful Burrus, prefect of the prætorian guard. For a time he ruled well. Then he freed himself from his mother's influence and gave himself up to a life of excesses. Nero's cruel deeds were equaled only by his silly vanity, and he posed as a poet and singer. He was accused of setting fire to Rome; and was also reported to have enjoyed the spectacle of the burning city from the roof of his palace. When public feeling ran high against him, he turned the popular fury by accusing the Christians of the deed, whom he cruelly

persecuted. He began the rebuilding of the city, and at about this time erected the great palace on the Palatine Hill which was called the Golden House. Two conspiracies against him failed, but at length the legions in the provinces revolted, the Senate at once proclaimed him an enemy, and he committed suicide to escape falling into the hands of his foes.

Nervous, *Nur' vus,* **System,** the nervous mechanism of the animal body consisting of the nerve centers and the nerves connected with them. Some animals, such as the starfish, possess very simple nervous systems, consisting of a central nerve ring with fibers extending outward. In man the nervous system is exceedingly complex, and consists of the cerebrospinal and sympathetic systems. The cerebrospinal system includes the brain and spinal cord, and the cranial and spinal nerves (See BRAIN; SPINAL CORD).

The distinguishing property of the nervous tissue is its conductivity, or power to transmit messages in a way similar to that by which they are transmitted over the telephone wires. The cerebrospinal, or central, system may be likened to the telephone exchange, and the connecting nerves to the incoming and outgoing wires over which the messages pass. There is one very great difference, however, between the human mechanism and that of the telephone. In the former, incoming messages pass over one set of nerves, and outgoing messages over another set; and under no circumstances can their functions be made to operate interchangeably. The nerves over which the incoming, or afferent, impulses pass are sensory. They transmit sensory impressions from the sensory end organs of touch, hearing, vision, smell and taste to the nerve centers. Those nerves over which the outgoing, or efferent, impulses are carried are motor. They terminate in the muscles and give rise to muscular movement. Now, the function of the great nerve centers is the conversion of incoming nerve impulses into outgoing nerve impulses, causing an appropriate movement. Raising an umbrella in a shower is a good illustration of changing incoming nerve impulses to proper outgoing impulses. We see the rain, or hear or feel it; that is, the information that it is raining is conveyed to the brain over the nerves of touch, sight or hearing, or over them all. These impulses stimulate to action the motor centers controlling the movements of the arms, and the umbrella is raised. Such an act is complex, involving both the sensory and motor nerves, the brain centers, in which these nerves originate, the transmission of the impulses received through the centers of the sensory nerves to the proper centers of the motor nerves, and the discharge of impulses from these centers to the motor nerves of the arms. Raising the umbrella is a purposeful act; therefore it is directed by the will. A much simpler process is found in reflex action, by which a sensory impulse is directly translated into muscular impulse without the interference of consciousness. If a barefoot boy steps on a tack, the foot is instantly withdrawn before he is conscious of what has happened. The sudden act of withdrawal, then, is obviously the result of some process not connected with the brain, which we have called the seat of consciousness. In such an act the sensory impulse is simply turned back along a motor pathway by a nerve cell in the spinal cord (See REFLEX ACTION).

The brain and spinal cord contain millions of these nerve cells, which constitute a mass of gray matter whose structure has been described in the article on the brain and spinal cord. It has been estimated that the number of nerve cells of the human nervous system is three thousand million. From each cell fine fibers branch out and interlace with the fibers of other cells and transmit impulses to one another, or pass out of the spinal column and extend to various parts of the body. Outside the spinal column all nerve cells are called peripheral nerves. Twelve of these peripheral nerves arise from the under surface of the brain and are distributed over the head and to the upper part of the trunk. These are called cranial nerves

(See CRANIAL NERVES). Branching from the spinal cord are other peripheral fibers called spinal nerves. There are 31 pairs of these spinal nerves. Their fibers arise in the cells of the gray matter in the spinal column and, penetrating the white fibers enclosing this gray cell substance, pass out through openings between the vertebræ. Those passing from the anterior part of the cord are motor nerves; those from the posterior side are sensory. Outside the cord the sensory nerves form a ganglion, or enlargement, caused by an aggregation of cells, and then unite, each with its adjacent motor nerve, to form a nerve trunk. The trunks proceed a short distance and then begin to branch and interweave, forming what is called a plexus; the trunks of the right side of the body send branches upward and downward, which unite with the branches from the trunks above and below, and finally are distributed to the skin, a motor nerve branching wherever a sensory fiber branches and accompanying it as persistently as the bark accompanies the twig. Those of the left side ramify in the same manner.

THE SYMPATHETIC NERVOUS SYSTEM. This branch of the nervous system is made up of ganglia which extend from the head to the pelvis, passing through the neck, thorax and abdomen. These nerves resemble those of the cerebrospinal system in appearance and structure, but they are less sensitive and act more slowly than the latter, and they control the functions of digestion, secretion and excretion and circulation. The ganglia lie in pairs on each side of the spinal column, and all unite to form a single ganglion in the pelvis. In the head the sympathetic nerve fibers extend to the palate and mouth glands and to the muscles of the eye. The ganglia of the thoracic cavity are connected by a sympathetic fiber and communicate with the cerebrospinal nerves. The chief abdominal ganglia are the largest in the body. Their branches unite to form the solar plexus, which is situated behind the stomach. From this ganglion nerves pass to other abdominal plexuses and to the abdominal blood vessels. Like the thoracic ganglia, those of the abdominal region are connected by a sympathetic cord and are connected with the cerebrospinal system by spinal nerves.

Nes'tor, a Greek hero, son of King Neleus of Pylos, distinguished for his wisdom and eloquence. He aided the Lapithæ against the Centaurs, hunted the Calydonian boar, sailed in the Argo, and, at an advanced age, conducted forces in 20 ships against Troy.

Nesto'rians, a religious sect of Eastern Christians, whose name is derived from Nestorius, Bishop of Constantinople, 428-431. In 431 Nestorius was condemned by the Council of Ephesus for preaching the doctrine of the dual personality of Christ, and some years later was banished to Egypt. His followers, driven into Persia, gained control there of ecclesiastical affairs, in the fifth century establishing the Nestorian Church as a separate organization. They reached the height of their power in the 13th century, but from this time on their prosperity lessened. Not only was their number decreased by the persecutions of the Tartars, but internal dissensions also weakened the Church. Some of the Nestorians joined the Roman Catholic Church; in 1898 the Persian branch, about 30,000 persons, joined the Orthodox Church of Russia; the remnant today number less than 100,000.

Nests of Birds. The nests of birds are designed for the protection of the eggs and also of the young until they are able to care for themselves. The nests are of many degrees of complexity and are usually hidden so as to be concealed from possible enemies; rarely, they are placed in conspicuous places. A few birds make no nests and lay their eggs on the bare rocks or ground; such are the auks and other sea birds, which nest in large colonies on the cliffs, and the nighthawk. Many birds, as the loon, construct just enough of a nest to keep the eggs from rolling about. The whippoorwill gathers a few leaves to form a depression in which the eggs are laid. The grebes build a bulky nest of water plants

in marshy places, and cover the eggs with vegetation when leaving the nest or when danger is near.

The tunnelers, like the bank swallow and the kingfisher, dig tunnels in sand banks to the depth of from 3 to 10 ft., and make a small chamber at the end, which may or may not be lined with feathers; the burrowing owl usually makes use of a discarded prairie dog's burrow. In Australia and parts of Asia certain birds, called brush turkeys, build large mounds of sand, leaves, etc., often 15 ft. high and 60 ft. in circumference, in which the eggs are buried until the heat, generated by the accumulated material, hatches them. The majority of ducks, geese, gulls and terns and the wading birds build their nests on the ground, using seaweed, rushes and other water plants, and lining their structures with down and feathers.

Some birds are known as the masons because they build a nest of kneaded clay; the retort-shaped nests of the cliff swallows, which are placed on the face of a cliff, and the mud nest of the barn swallow are of this class. Others nest in the holes in trees, lining the nest with feathers or other material. If, like the woodpecker, they dig the hole themselves they are called carpenters.

Among the tree nesters are also the platform builders, like the mourning dove, that build rude platforms of sticks; and the basket makers, like the catbird and the brown thrasher, that make large, open nests resembling baskets. A species of thrush living in South Africa constructs a series of nests in a single mass with a roof of twigs overhead and a woven gallery leading to each nest. Among the woven nests are the hanging structures of the orioles and the vireos, made of the finest grasses and lined with softest down. The nest of the social weaver bird excels all others in size, for it is the nest of a colony and resembles a huge umbrella with the individual nests situated along the edges of the platform. The tailor bird sews together two parts of a leaf to make a receptacle for its beautifully-woven nest. Other nests are circular or dome-shaped with the opening at the center of the side; such are the home of the marsh wren, which is attached to reeds in swampy places and is woven of sedges and lined with plant down, and the simpler arched nests of the ovenbird and the meadow lark.

The highest art of nest building is found among such birds as the American goldfinch and the humming bird, which build compact nests of felt made from animal or vegetable wool strongly matted together. The outside framework is made of fine grass or rootlets and the nest is firmly bound in the crotch of a tree. The chimney swift secretes a sticky saliva, with which it cements a few sticks together and fastens them to the inside of a chimney. A sea swift of China makes its nests entirely of a sticky mucus and places them on the sides of rocky caves; these are the edible birds' nests eaten by the Chinese. Consult Rennie, *The Architecture of Birds;* Wood, *Homes Without Hands;* Dugmore, *Bird Homes.*

Net, a fabric of twine, cord or like material used in capturing fish, insects or even Mammals. The wide use of the net in the taking of fish has led to the invention of numerous varieties adapted to different purposes or for the taking of different fish. There are three chief varieties: the trawl, the gill net and the seine. The trawl is a large bag net for deep-water fishing. Its mouth is held open by beams, and it is dragged along the sea floor. This form of net is frequently called the beam trawl or purse net. Gill nets are those whose meshes are of sufficient size to admit the head of the fish, but whose strands catch in the gills when the fish endeavor to extricate themselves. These are used in any depth of water sufficient to float them and are generally placed across channels through which fish commonly pass. Because of their position they are sometimes known as drift nets. The seine is a long net having sinkers on one edge and floats upon the other. It generally hangs vertically in the water, but may be somewhat baglike. It is designed to be drawn in at the ends and so brought to shore.

Pound nets, of common use in the Great Lakes, are the modern form of the ancient weir. They are set much like a fence supported by stakes, and are terminated by a labyrinth of net. A less well-known variety is the type net, which is somewhat cylindrical in form. It is set at the bottom and has several compartments, entrance to which is by means of funnels that allow the fish to swim into the net but not out of it. Such nets are generally set at night and lifted the next morning. Change in nets since earliest times has been very slight, the greatest improvements being in the machinery for raising or lowering them. After use, the nets are generally cleaned and spread upon frames to dry so that the cords will not decay.

Neth'erlands, or Hol'land, a constitutional monarchy of western Europe, forming with Belgium the lowest part of the Continent. It lies between 50° 45′ and 53° 30′ north latitude and 3° 25′ and 7° 12′ east longitude, and is bounded on the e. by Prussia, on the s. by Belgium and on the w. and n. by the North Sea. Its area, 12,741 sq. m., exceeds that of Maryland, and it represents one of the smallest independent states of Europe.

Surface and Rivers. The surface of the country has in large part shaped its history. No point is more than 120 m. distant from the sea, and small areas are from 16 to 20 ft. below sea level, while almost the whole territory is too low for natural drainage. Along the northern boundary is the Zuyder Zee, once in part an ancient lake. Along the coast are numerous islands, including the Frisian group, comprising Texel, Vlieland, Ameland and others. Dunes, dikes and polders (enclosed swampy pieces of land for reclaiming purposes) guard the country against the sea. The dunes have been formed naturally by the wind and sea, and long ridges of sand from 35 to 200 ft. high and from 20 to 60 ft. apart have been heaped up from the ocean. The dikes are earthen and are protected by stone-slopes and piles. Whatever land is reclaimed possesses a high degree of fertility, after the peat has been cut away and the moss and heather removed from bog or moor. Attempts are now being made to recover the Zuyder Zee. The highlands are chiefly sand hills, and the highest elevation, 1050 ft., is in the extreme southeast. The important rivers of Netherlands are the Rhine, the Meuse and the Schelde, and they are all international streams of commercial significance. The arms of the Rhine include the Waal, the Lek and the Yssel. Numerous lakes exist, and among those which have been drained are the large Haarlem Lake, whose bed has now yielded 72 sq. m. of arable land.

Climate. The climate is moist, and there is not a wide range of temperature in winter and in summer. Bright weather at extended intervals is rare, and the damp and misty days breed marsh fevers and similar diseases, though on the whole the country is said to enjoy a healthful climate.

Fisheries, Mining and Agriculture. The fishing industry consists of river and coast and deep-sea fishing, and is highly important. The chief branches are the herring, oyster and sprat fisheries, and the value of the catch is estimated at over $3,000,000 annually. The mineral supply is small. Peat, or turf, is cut in large quantities, and a fairly large amount of coal is mined, while from the Rhine, clays, bricks and tile are produced to supply the deficiency of building stone.

Only about three-tenths of the surface is cultivated land, but along the rivers in the south and in the northern and western provinces agriculture has reached a high state of development. The chief products are wheat, rye, buckwheat, hops, sugar beets, tobacco, potatoes and flax, and the yield is comparatively large, due to careful and efficient methods of tillage. The country ranks sixth in the production of beet sugar. Vegetables are grown in large quantities, and the cultivation of flowers is practically unsurpassed in Europe, the bulbs and seeds, particularly of Haarlem, being known all over the world. The moist climate is favorable for pasture growth,

and the breeding of cattle, horses, sheep and poultry is given careful attention. In proportion to its area Netherlands is the foremost dairy country of Europe, and the products, which are extensively exported, are celebrated for their high degree of excellence. Eggs and honey are also exported.

MANUFACTURES, COMMERCE AND TRANSPORTATION. Manufacturing is not so extensive as in some other countries, due to a deficit of coal and iron, and very few articles are exported. Ships, machinery, hardware, railroad material, tin plate, gold and silver ware and textiles are manufactured. Linen, calicoes, sail cloth and woolens are extensively produced, but the Dutch woolens have gradually been equaled by those of Germany, England and France. The diamond industry of Amsterdam is wholly in the hands of the Jews, and has not lost its importance despite the competitive trade of Paris, Antwerp and London. The Dutch trade is preeminently maritime and includes every continent. The greatest profit results from the carrying and forwarding trade, and one of the chief branches of the commercial activity is the importation and reexportation of Dutch colonial products throughout the world. Rotterdam and Amsterdam have become the centers of trade as a result of the great ship canals that have been constructed. The North Sea Canal, built between Amsterdam and the North Sea, is 16 m. long and is large enough to meet all the requirements of the modern shipping trade. The whole country is a net of these waterways, even the small villages being connected with one another by means of canals. International commerce is carried on chiefly by the railroads, for they transport most of the materials that England sends into the heart of the Continent. The State owns about one-half the railroad mileage. Good wagon roads, paved with brick, are found throughout the country and measure approximately 3000 m. in length.

INHABITANTS. The population of Netherlands consists chiefly of peoples of Celtic and Teutonic stock. The Celts were gradually conquered, and the Batavians, of Teutonic stock, comprise about 70 per cent of the population. They dwell in Zeeland, Gelderland, Utrecht and the provinces of North and South Holland. Other groups are the Frisians of Drenthe, Friesland, Groningen and Overyssel, and the Flemings of Limburg and North Brabant.

GOVERNMENT AND RELIGION. Netherlands is an hereditary monarchy according to the constitution of 1815, later revised. The two chambers of the Parliament have unequal powers. The Upper Chamber, comprising 50 members, is elected by the provincial legislatures of the kingdom. They serve for nine years, and are chosen from among the highest taxpayers and from high officials. The Lower Chamber consists of 100 members, elected by direct suffrage and by districts. Those qualified to vote for the members of this chamber are male citizens over 25 years of age who own or dwell in houses or boats or who show marked business ability or are generally capable. Both chambers ordinarily meet once a year, but sessions in extraordinary may be summoned by the Crown at any time. The sovereign is, in rights, inviolable and irresponsible, and exercises his executive powers through ministers presiding over the eight departments: foreign affairs, interior, finance, justice, colonies, marine, war and public works and commerce.

There is complete religious freedom, and numerous sects and creeds exist. The Protestants belong chiefly to the Dutch Reformed Church. The Roman Catholics rank next in numbers and live south of the Rhine. The Jews live in North and South Holland; there are about 9000 Jansenists.

CHIEF CITIES. The principal cities are The Hague, the capital; Rotterdam, Amsterdam, Utrecht, Haarlem, Groningen, Leyden and Arnhem.

HISTORY. The present kingdoms of Holland and Belgium were originally included in the Low Countries, or Netherlands. The early inhabitants were con-

THE TEMPLE OF PEACE, THE HAGUE

The gift of Andrew Carnegie, for the use of the Permanent Court of Arbitration.

A HOME OF ROYALTY

THE KING'S PALACE, AMSTERDAM

This, the city's handsomest secular building, was presented to King Louis Napoleon in 1808.

quered by the Romans in the first century A. D. The Franks conquered the southern part in the fifth century, and by the eighth century the whole region was under Frankish rule. By the Treaty of Verdun (843) it was divided into three parts, and the inhabitants gradually developed into two distinct peoples; the northern became German in manners and customs, while the southern adopted the language and characteristics of the French. When Charles the Bold of Burgundy died in 1477, the rich Flemish towns which had sprung up were rewarded for their fidelity to his daughter, Mary, by a grant of *The Great Privilege*, which promised that legislative meetings could be held at will, that the people should assess their own taxes and decide questions of war. By her marriage with the Emperor Maximilian, Mary caused the country to become a possession of the House of Hapsburg.

Charles V received Netherlands as a part of his vast inheritance, and tried to suppress the growth of Protestantism. His son, Philip II of Spain, with the best soldiers of Europe and enormous resources, was animated with such religious zeal that he was willing to sacrifice the country in order to extirpate the new faith. At last the provinces rebelled because of the severe persecutions, and in 1579 the seven northern states drew together in a permanent confederation, known as the Seven United Provinces of the Netherlands, with the Prince of Orange as stadtholder (See WILLIAM OF ORANGE). This was the virtual founding of the renowned Dutch Republic. The seven provinces declared their independence in 1581. The ten Catholic provinces in the south ultimately returned to their Spanish allegiance (See BELGIUM, subhead *History*).

Philip II died in 1598, but the war was continued by his successor, Philip III, and so stubborn was the resistance of the Dutch that the King of Spain entered into the celebrated Truce of 1609, a virtual acknowledgment of the independence of the provinces. In the Peace of Westphalia (1648), their independence was formally recognized. In the 17th century Netherlands became a foremost commercial and maritime power, and by 1640 Dutch vessels were carrying the greater part of the world's commerce. The power of Louis XIV on the Rhine, the Navigation Acts and the open-war policy of England led to the commercial decline of the country. It was overrun by French armies during the French Revolution, and Belgium was annexed to France, while Holland was conquered and called the Batavian Republic. During the Napoleonic wars the country was annexed to the French Empire.

By the Congress of Vienna (1814-15), Holland became the Kingdom of Netherlands, with the House of Orange restored as rulers, and Belgium, in spite of its protests, was added to it. In 1830 Belgium formed an independent kingdom. Since then there have been no violent changes, and advancement has been made in constitutional government. The Hague has become the seat of the Permanent Court of International Arbitration. Population of Netherlands 6,583,227.

Net'tle, a name given to a number of species of the Nettle Family, most of which produce a coarse fiber used in making ropes. They are all herbs, with a watery juice and stems covered with many stinging hairs. The leaves are rough, almost stemless, and have rounding scallops on their margins. The hemp nettle, common everywhere, has been naturalized from Europe and is used in the production of fiber. In Dresden a fine thread, and in China grass cloth are made from the fibers of a nettle.

Neuchâtel, *Nu" sha" tel'*, **Lake of,** a lake in the western part of Switzerland, 19 m. n. of the Lake of Geneva. It is the third in size among Swiss lakes, having a length of 24 m. and a width varying from 2 to 5 m. The shores are generally low and marshy, and the hillsides are covered with vineyards and forests. As a whole, it lacks the beauty and picturesqueness of so many other Swiss lakes.

Neuralgia, *Nu ral' ji a,* a term used to denote a condition of the nerves, which gives severe pain in one or more distinct nerves. It is caused by injuries to or inflammation in the nerve, by irritation produced by disturbances in adjacent parts, and usually affects thin-blooded persons of weak nerves, who have been suffering from overwork, general depression or loss of vitality. When the malady occurs in the head, it is called tic douloureux; when in the chest, intercostal; in the breast it is angina pectoris. Neuralgia is frequently brought on by exposure to cold or dampness, overindulgence in alcoholic beverages or by a wound. It often occurs in the course of typhus or intermittent fevers.

Neurasthenia, *Nu" ras the' ni a,* a disease of the nervous system resulting from long-continued strain. While the greatest number of cases result from overwork, other causes are intemperate use of alcohol and tobacco and vicious habits. The symptoms of the disease are numerous; irritability, nervousness, insomnia and indigestion are conspicuous among them. It aggravates organic diseases, and is itself rendered more acute by such diseases and more resistant to treatment. Rest and outdoor exercise, freedom from worry and responsibility constitute the best remedial agencies. In the United States neurasthenia is very common, and attacks men and women impartially.

Neuritis, *Nu ri' tis,* inflammation of one or more bundles of nerve fibers. Two varieties have been recognized, the localized and the multiple. In localized neuritis a single nerve may be affected as a result of exposure to cold, blows or wounds, or any other injury to the nerve. The first symptom of this form of neuritis is a penetrating pain along the course of the nerve and its branches, and sensitiveness of the affected parts to pressure. Movement of connecting muscles also becomes painful. Multiple neuritis is that form of the disease which may affect many of the nerve endings near the outer surface. It may result from a variety of causes, such as poisoning by lead, mercury, copper or phosphorus, general disorders, local action of certain diseases or the immoderate use of alcohol. The last cause is the most common.

Neuroptera, *Nu rop' ter a,* a group of Insecta in which are classed the ant lions and lace-winged flies. The members of the class are distinguished by their many-veined wings. The larva, or the insect in the second stage of its development, is active and carnivorous, and in its adult stage may be known by the jointed appendages about its mouth. See INSECTA; ANT LION.

Neutral'ity, a term applied in international law to the status of a state which maintains an attitude of noninterference in respect to existing war between other states, rendering neither aid nor service to either belligerent in military operations. The doctrine of neutrality constitutes a large part of the existing body of international law, but in medieval times it was of little importance. The first recognition of neutral rights was embodied in a maritime code which declared that the goods of a neutral were exempt from capture, although found on an enemy's vessel. This liberal rule was adopted by all European nations and continued as the principle of maritime warfare until superseded by the rule embodied by the Declaration of Paris in 1856, which was to the effect that the goods of an enemy (contraband of war excepted) under a neutral flag, and neutral goods (contraband excepted) under an enemy's flag, are free from capture.

Several forms or gradations are now recognized — absolute, perpetual and armed neutrality. It is not a violation, however, of neutral duty to discharge the duties of humanity to either belligerent. The foundation of the neutrality policy of the United States was laid during Washington's administration when, upon the outbreak of war between England and France, the President issued a public proclamation, after consideration of all obligations to France under the Treaty of 1778, that the United States would remain neutral, and warned all

citizens of the United States to abstain from giving aid to either belligerent.

Neutral Nation, an Indian tribe related to the Iroquois. When discovered by the French they were living on the north shore of Lake Erie in Ontario and extended eastward as far as the Genesee River in New York. Their original name is not known. The French called them the Neutral Nation because they remained neutral in the wars between the Iroquois and the Huron. In 1651 the tribe was totally destroyed by the Iroquois.

Ne'va, a river of Russia, connecting Lake Ladoga with the Gulf of Finland, into which it empties. It discharges into the gulf by several mouths, which are separated by islands. Its length from Lake Ladoga to St. Petersburg is 40 m., and its breadth is from 800 to 2000 ft. The river is navigable its entire length and is an important waterway connecting the interior of northern Russia with the sea.

Nevada, *Ne vah' da,* THE SAGEBRUSH STATE, one of the Mountain States, is bounded on the n. by Oregon and Idaho, on the e. by Utah and Arizona and on the w. and s.w. by California. That part of the state south of the 39th parallel has the shape of a triangle with an irregular apex.

SIZE. The extreme length from north to south is 483 m. and the greatest breadth is 320 m. The area is 110,690 sq. m., of which about 869 sq. m. are water. Nevada is a little larger than Colorado, less than half the size of Texas, about the size of the New England States and Pennsylvania combined and the sixth state in area.

POPULATION. In 1920 the population was 77,407. From 1910 to 1920 there was a loss in population of 4,468, or 5.5 per cent. The number of inhabitants to the square mile is .7, and the state's rank in population, including the District of Columbia, is 49.

SURFACE. The northern part of the state consists of a plateau 4000 ft. in altitude lying between the Sierra Nevada Mountains on the west and the Wasatch Mountains on the east. Numerous parallel ranges from 20 to 50 m. apart and varying in altitude from 6000 to 8000 ft. run north and south through the state. These are broken by passes and valleys. In the southwestern portion is an alkali plain over which a few mountains are scattered. In some sections there are ranges extending in a general east and west direction. The highest point in the state is Wheeler Peak, 13,058 ft., near the central point of the eastern boundary.

RIVERS AND LAKES. In the southwestern part of the state there are no rivers of importance. The Humboldt, rising in the northeast and flowing across the state to Humboldt Lake, is the principal stream. The Walker, Carson and Truckee rivers rise in the Sierra Nevadas and flow into lakes in the west-central part of the state. In the north is the Owyhee River, flowing into the Snake, thence to the Columbia.

Nevada contains several lakes. Pyramid Lake, 35 m. long and 10 m. wide, is the largest. Lake Tahoe, on the western boundary, is the most noted because of its remarkable beauty. This charming mountain lake is over 5000 ft. above the sea and is 21 m. long. Other lakes are Mud, Carson and Walker.

CLIMATE. Nevada has a mild temperate climate and the air is dry and healthful. The state is subject to great extremes of heat and cold, but these are not of frequent occurrence. The average temperature for winter is about 28° and for summer, about 71°. The rainfall is very unevenly distributed, most of the rain occurring between December and May. Nevada is the most arid state in the Union, the average rainfall being less than 12 inches. In some sections rain never falls.

MINERALS AND MINING. Nevada contains rich deposits of gold and silver, besides lead, copper, quicksilver, nickel, sulphur, gypsum, salt and borax. Near Virginia City is the famous Comstock lode, a vein containing deposits of gold and silver, which at one time produced over $38,000,000 worth of bullion in a year, and a total of $700,000,000 since

1860. The annual output of gold is now over $15,000,000; and of silver, over $7,000,000. The most important fields are in the vicinity of Tonopah. Among the building stones are limestone, granite, slate, sandstone and marble. Some lignite coal is also mined on the Elko River.

AGRICULTURE. Owing to the lack of rainfall and distance from markets, agriculture is not a leading industry in Nevada. The soil, however, is fertile, and good results are obtained in the irrigated sections. Numerous farms are found in the Valley of the Humboldt River and in the west-central parts of the state. The chief field crops are hay, spring wheat, oats, potatoes and vegetables. Apples, peaches, plums and pears of excellent quality are raised. Live-stock raising is an important branch of agriculture in those sections where there is an abundance of prairie grass, and large numbers of cattle and sheep are raised. Cashmere and Angora goats are also raised to a limited extent. Undoubtedly when present plans for constructing irrigation projects are carried out, Nevada will become an important agricultural state.

MANUFACTURES. The principal manufactures are railway cars, dairy products, flour and gristmill products, saddlery and harness, clothing, chemicals, boots and shoes, brick and tile, wagons and carriages, confectionery, liquors, lumber products and salt. Closely connected with the mining industry are the smelting and refining of ores and the making and repairing of mining machinery and tools. The lack of good railway facilities has prevented any great development of manufacturing.

TRANSPORTATION. The principal line of railway in Nevada is the Southern Pacific, which crosses the northern portion of the state from east to west. This road has a branch line running northward from Reno, and one southward to Walker Lake. The southeastern part of the state is crossed by the San Pedro, Los Angeles & Salt Lake road, but much of this region is without railway lines.

GOVERNMENT. The constitution which was adopted in 1864 is still in use. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer, comptroller, superintendent of public instruction, surveyor-general and attorney-general, each elected for four years. The Legislature consists of a Senate and House of Representatives, the combined membership of these houses being limited to 75. The Senate cannot have less than one-third nor more than one-half of the number of members in the House. Senators and representatives are elected for two years. Sessions are biennial and limited to 60 days. The Legislature convenes on the third Monday of January of odd years.

The judicial department consists of a Supreme Court, District Courts and justice courts. There are also various courts in cities and towns.

EDUCATION. Nevada has a good system of public schools with high schools in all important towns. The schools are in charge of a state board of education, a superintendent of public instruction and five deputy superintendents. Education is compulsory. The state university and agricultural experiment station are at Reno.

STATE INSTITUTIONS. The state hospital for the insane is at Reno, the orphans' home at Carson City and the penitentiary at Carson City.

CITIES. The chief cities are Carson City, the capital; Reno, Goldfield, Tonopah, Ely, Elko and Sparks.

HISTORY. Nevada, the Spanish "snowy," referring to the Sierra Nevada Mountains, was visited by Spanish friars about 1775, by trappers, some 50 years later, and by Fremont in 1843. It came to the United States by the Treaty of Guadalupe Hidalgo. Having established a camp in 1848, Mormons prospered until 1856. The discovery of silver, 1859, caused Nevada Territory to be organized out of Utah, west of 113°, in 1861. It became a state in 1864, and its area was added to until 1866. The recent discovery of gold in new localities has given new impetus to the state's industrial life. Consult Bancroft's *Nevada and Her Resources.*

Governors. H. G. Blasdel, 1865-1870; L. R. Bradley, 1871-1878; J. H. Kinkhead, 1879-1882; Jewett W. Adams, 1883-1886; Christopher C. Stephenson, 1887-1889; Frank Bell, 1890; R. K. Colcord, 1891-1894; John E. Jones, 1895; Reinhold Sadler, 1895-1902; John Sparks, 1903-1906; D. S. Dickerson, 1907-1910; T. L. Oddie, 1911-1915; Emmet Boyle, 1915—. James W. Nye was territorial governor from 1861 to 1864.

Nevada, Mo., a city and the county seat of Vernon Co., 103 miles south of Kansas City, on the Missouri, Kansas & Texas, the Missouri Pacific, and other railroads. The surrounding country is undulating prairie, soil dark and very productive and easily cultivated. Much attention is given to stock raising. In the town are large zinc smelters, ironworks, flour and feed mills, a foundry and saw and planing mills. Notable features of the city are St. Francis Academy (Roman Catholic); Cottey College for young women, founded in 1884 and controlled by the Methodist Episcopal Church (South); the state hospital for the insane; an orphans' asylum; and Lake Park Springs on the borders of a beautiful lake near the city limits. Settled about 1830, Nevada was incorporated about 1865, and in 1883 was chartered as a city. Population in 1920, U. S. Census, 7,139.

Nevada State University, at Reno (1873). This institution was founded at Elko in 1873, removed to Reno in 1885 and formally reopened the next year. It is the one institution of college grade maintained by the state. The university proper offers the usual courses in its colleges of agriculture, of arts and sciences, civil, mechanical, electrical and mining engineering, and of education. It has a library of some 20,000 volumes. It normally enrolls from 350 to 400 students.

Nev'in, Ethelbert (1862-1901), an American composer, born at Edgeworth, Pa. He studied in America and in Berlin, and spent much of his time between 1893 and 1900 in Europe. In the latter year he became associated with H. N. Parker in the department of music at Yale University. His works consist of compositions for the piano, and songs, and are characterized by delicacy and originality. Among his well-known compositions are *Narcissus* (in the group *Water Sketches*), four pieces in the collection entitled *A Day in Venice,* and the song, *The Rosary.*

New Albany, Ind., a city and county seat of Floyd Co., opposite Louisville, Ky., on the north bank of the Ohio River, 2 m. below the falls and on the Baltimore & Ohio Southwestern, the Chicago, Indianapolis & Louisville, the Pittsburgh, Cincinnati, Chicago & St. Louis and other railroads. A railroad bridge across the river connects the city with Louisville. New Albany is an important manufacturing center having engine and boiler works, furniture factories, plate-glass works, iron foundries, rolling mills, cutlery and edge-tool works, flour mills, woolen and cotton factories and extensive pork-packing establishments. De Pauw College for women, St. Mary's Academy and Holy Trinity Academy (Catholic) are located here. There is also a National cemetery near the limits of the city. The town was settled in 1813 and received a city charter in 1839. Population in 1920, 22,992.

New'ark, N. J., a port of entry, county seat of Essex Co., and metropolis of the state, on Newark Bay and the Passaic River, 8 m. w. of New York City, and on the Pennsylvania, the Delaware, Lackawanna & Western, the Erie, the Lehigh Valley and the Central of New Jersey railroads. Various steamboat lines are engaged in coastwise trade; the Passaic River flowing into Newark Bay furnishes the city with a direct waterway to the ocean. There is a water frontage of over 10 m., and the city contains a total area of about 30 sq. m. Numerous local trains and electric cars connect with the ferries and tunnels to New York City. Interurban lines also connect with Paterson, Jersey City, Rutherford and the residential suburbs, including Nutley, Montclair, Irvington, Belleville, Glen Ridge, the Oranges and Bloomfield.

Newark ranks 15th among the most important manufacturing cities of the United States.

Parks and Boulevards. Broad and Market streets are the principal thoroughfares of the city. Washington, Lincoln and Military parks are the older city parks; Branch Brook, West Side, East Side and Weequakic of 265 acres are among the more recently added parks of the city system. There are over 265 m. of streets and an excellent waterworks plant owned by the city. Newark contains a large percentage of home owners. Mt. Pleasant, the Holy Sepulchre and Fairmount are the principal cemeteries.

Public Buildings. Among the noteworthy buildings are the county courthouse, built in 1899, the Federal Building, city hall and a public library. The Prudential, Firemen's Insurance, Kinney, Bamberger and Mutual Benefit banks and business corporations have fine office buildings. There are about 186 churches, including a Catholic cathedral. Newark is the seat of a Catholic see and of an Episcopal bishopric.

Institutions. Newark Academy, founded in 1792, is one of the leading educational institutions. The city maintains about 12 vacation or summer schools, a school of drawing, a normal and a technical school as a part of its public school system. There are a large number of private schools, which include St. Vincent's Academy and St. Benedict's College. The New Jersey Historical Society has a collection of great historical value. The Essex County Lawyers' Club and the Prudential Insurance Company also own valuable law libraries. Among the benevolent and charitable institutions, which number about 75, are St. Michael's, St. Barnabas, St. James, German, the city and babies' hospitals, an Eye and Ear Infirmary, Home for Crippled Children, House of the Good Shepherd, Newark Orphan Asylum, a home for aged women and several day nurseries. The city is the seat of the Essex County Hospital for the Insane. At Verona, near the city, is the City Home for boys, in which farming and various trades are taught.

Industries. Newark has long been noted for its manufacture of leather products. The making of patent leather early became an important industry, and the manufacture of celluloid is peculiar to the city. Other extensive manufactures include shipbuilding, felt hats, chemicals, clothing, boots and shoes, saddlery and harness, chairs, carriages, stamped ware, enameled goods, jewelry, silverware, cigars, buttons, trunks and valises, thread, watchcases and varnishes. There are also smelting and refining plants for refining lead and copper. An art pottery was established in 1905. Insurance is an important business, a large number of companies having headquarters here.

History. The first settlement was made in 1666 by a small company of Puritans from Milford, Conn., and named in honor of Rev. Abraham Pierson, whose old home was at Newark-on-Trent and who had accompanied the settlers to found a new home. By 1685 Newark was a compact town of about 500 inhabitants and continued essentially Puritan for more than 50 years. Partly on this account and partly on account of independent industrial interests, Newark has kept a separate character of its own in spite of its proximity to New York City. Newark was first incorporated in 1693 and received its first city charter in 1836. Another charter was granted in 1857. Population in 1920, U. S. Census, 414,524.

Newark, Ohio, an important city and county seat of Licking Co., 33 m. n.e. of Columbus at the junction of three forks of the Licking River, on the Ohio Canal and on the Pennsylvania, the Baltimore & Ohio and other railroads. There is excellent interurban electric service to Columbus, Dayton, Springfield, Granville and many other towns and cities. Newark is situated on a level plain surrounded by hills and is the center of a great gas field. Coal fields are also located to the east and south, a distance of about 25 m. Buckeye Lake, 10 m. to the southwest, is one of the most attractive

and popular summer resorts of the state. Newark is attractively laid out and contains broad, well-paved and shaded streets and handsome residences with lawns and gardens. Idlewilde, Sixth Street and Moundbuilders parks are the largest of the park system. Cedar Hill and Mt. Calvary are beautiful cemeteries adjoining the city.

Among the noteworthy buildings are the Soldiers' and Sailors' Memorial Building, Auditorium, courthouse, Y. M. C. A. Building, Federal Building, Elks' Club Building, good business houses and New Country Club Building. There are over 24 churches. The educational institutions include a high school, public and parochial schools and a public library. Other institutions include a city hospital and the Licking County Children's Home.

Newark is essentially a manufacturing city, its principal products including bottles, stoves, table glassware, art glass, reflectors, shoes, street cars, oil tanks, cigars, steel rails, sleigh runners, hardwood finish, soap, halters, safes, kitchen utensils, furniture, fertilizers, harness, wire cloth, boilers, furnaces, flour, golf sticks, brick, flavoring extracts, clover hullers, engines, boilers and motor trucks. Tributary to the city are fertile agricultural sections, and there is an important trade in live stock and farm and dairy products.

Ancient earthworks of the mound builders are located in Newark. These earthworks occupy about three square miles and have a great variety of forms. Newark was settled in 1801 and laid out as a town in 1802. Population in 1920, U. S. Census, 26,718.

New Bed'ford, Mass., a city, port of entry and one of the county seats of Bristol Co., 56 m. s. of Boston, at the mouth of the Acushnet River at the head of New Bedford Harbor, an arm of Buzzard's Bay, and on two divisions of the New York, New Haven & Hartford Railroad. It is connected with Fall River, Onset, Brockton, Dartmouth, Taunton, which is the other county seat, and other places, by interurban electric lines. Steamer lines also connect daily with New York, Martha's Vineyard, Nantucket and Buzzard's Bay points. Ft. Rodman, on Clarke's Point, defends the entrance to the harbor. The city has an area of 20 sq. m. A four-mile drive around this point commands splendid marine views. New Bedford, which is connected by bridges with Fairhaven, is noted for the elegance of its private residences and public buildings.

Among the prominent structures are the public library, which is one of the oldest institutions of the kind in the country, a high school, St. Luke's and St. Joseph's hospitals, a state textile school and St. Mary's School and Home. The Sailor's Bethel, built in 1831, and containing memorial tablets reminiscent of the whaling days, is of interest. There are six large public parks. New Bedford, once noted for its extensive whaling interests, has grown to be an extensive manufacturing center. At one time the place was the principal port of the world's whaling industry and still holds first place with a fleet of about 20 vessels. The prosperity of New Bedford is now largely due to the cotton-spinning industry. The cotton and yarn mills are among the largest in the world and have given the city a leading position in the manufacture of fine cotton goods and cotton yarns. This industry has an invested capital of about $50,000,000. Among the manufacturing establishments are shoe factories, woolen mills, glassworks, lubricating-oil works, cordage works, silverware works, machine shops, paint and candle works, paper mills and soap factories. Much coal is shipped here.

The first settlement was made in 1652 by Plymouth colonists, and it was a part of Dartmouth until its incorporation in 1787. New Bedford occupied a prominent place in the Revolution. It was granted a city charter in 1847. Population in 1920, 121,217.

New'bern, N. C., a city, port of entry and the county seat of Craven Co., 87 m. n.e. of Wilmington, at the head of the estuary of the Neuse River at the

mouth of the Trent River, and on the Atlantic Coast Line, the Norfolk & Southern and other railroads. Navigation facilities have been increased by improvements made by the Federal Government, and the city has steamboat connection with Norfolk, Baltimore and New York, and has a considerable commerce. Both railway and highway bridges cross the river at this point. The leading activities are trucking and the manufacturing of lumber, chiefly pine; and the fisheries involve large interests. Other manufactures include knit goods, hosiery, carriages, barrels, fertilizer, turpentine, cottonseed oil, canned goods and pickles. Machine shops, a lime kiln and shipyards are in operation. The city ships considerable quantities of lumber, fish, cotton and market-garden produce. Among the points of interest are the Government Building, the courthouse and places associated with the city's early history. Newbern was settled in 1710 by a colony of Swiss and Germans, was incorporated as a city in 1723 and was for a time the capital of the Province of North Carolina. In March, 1862, it was captured by General Burnside after severe fighting. Population in 1920, U. S. Census, 12,198.

New Brighton, *Brī' tun,* **Pa.,** a city of Beaver Co., 28 m. n.w. of Pittsburgh, on the east bank of the Beaver River, 2 m. from its junction with the Ohio, and on the Pittsburgh, Ft. Wayne & Chicago and the Pittsburgh, Youngstown & Ashtabula divisions of the Pennsylvania Railroad. Coal fields and fire-clay beds are in the vicinity. It is connected by bridge with Beaver Falls. New Brighton is an important industrial center on account of its excellent water power, and has manufactories of brick, pottery, sewer pipe, glass, twine, coffee mills, nails, rivets, wall paper, bath tubs, fire engines, brass castings, chains and other commodities. The Beaver Valley General Hospital is located here, and also the public art gallery, library and a public park. The town was settled in 1709 and incorporated as a borough in 1838. Population in 1920, 9,361.

New Britain, *Brit' 'n,* **Conn.,** a city of Hartford Co., 9 m. s.w. of Hartford, on the New York, New Haven & Hartford and other railroads. The city is situated near the center of the state in an agricultural region and has an area of over 13 sq. m. Several interurban electric lines connect the city with the near-by towns and villages. The surrounding country is largely agricultural and the city is an important distributing and manufacturing center. New Britain is well laid out, with broad and shaded streets, and there are many attractive residences. There is a public park system, the largest of the parks containing about 100 acres. The city is the seat of a state normal school and contains a high school, public and parish schools and a public library, formerly the New Britain Institute. There are a large number of fine churches, including a Catholic cathedral. The most important manufactured products include hardware, cutlery and edge tools, hot-air registers, hosiery, knit goods, saddlery and harness, stamped ware and foundry and machine-shop products.

New Britain was settled in 1867 and remained a part of Berlin until 1850, when it was incorporated as a town. A city charter was granted in 1871. By act of the State Legislature in 1905 the Township of New Britain and the city of New Britain were united. The city was one of the first in the country to build a subway for telegraph, telephone and electric-light wires. Elihu Burritt, known as the learned blacksmith, was born in New Britain. Population in 1920, U. S. Census, 59,316.

New Brunswick, *Brunz' wik,* a province of the Dominion of Canada, bounded on the n. by the Province of Quebec and the Bay of Chaleurs, on the e. by the Gulf of St. Lawrence, on the s. by Nova Scotia and the Bay of Fundy and on the w. by Maine and the Province of Quebec. Its length from north to south is 210 m. and its greatest breadth is 190 m. The area is 27,985 sq. m. It is a little more than one-half the size of England and a little smaller than Scotland, one-

third larger than Nova Scotia and about the size of Vermont, New Hampshire and Massachusetts combined. Population in 1911, 351,888.

Surface. Ranges of hills or low mountains extend from Maine across the northwestern part of the province. These are a prolongation of the Appalachian Mountains. They range in altitude from 1000 to 2000 ft. and reach their highest elevation in Bald Mountain (2400 ft.) Along the Bay of Fundy the coast is high and rocky and contains numerous ravines. The eastern coast is low, and this coastal plain extends inland for several miles, where it rises to gently sloping hills. The central part of the province is generally rolling. The coast has numerous bays which form excellent harbors. Chignecto Bay, which forms the head of the Bay of Fundy, is noted for its high tides, which rise over 50 ft. There are excellent harbors on Miramichi Bay and the Bay of Chaleurs, and most of the rivers are navigable for several miles, so that each river estuary affords shelter for shipping.

Rivers and Lakes. The St. John, having a length of about 500 m., is the principal river. It flows into the Bay of Fundy and is navigable for light vessels to Fredericton, a distance of 88 m., and for small steamers 65 m. further. Its broad estuary is 50 m. long. Other streams of importance are the St. Croix, Miramichi, Restigouche, Petitcodiac and Richibucto, all navigable for greater or less distances. The land is a network of small streams and lakes, which are favorite haunts of anglers and sportsmen.

Climate. The climate is healthful and bracing, though subject to extremes of heat and cold. The mean summer temperature is about 60° F. and for the winter it is 19°. The autumns are remarkably pleasant. The annual rainfall is a little less than 33 inches. During winter snow falls to a great depth, the average being 97.5 inches for the season.

Forests and Lumber. Originally New Brunswick was almost entirely covered with forests, and large areas are still forested with valuable timber trees, including black spruce, hemlock, cedar, birch, beech, oak and other varieties. The black spruce is extensively used in the manufacture of wood pulp. The general distribution of forests over the province, the excellent harbors and numerous navigable streams have combined to make New Brunswick an important lumber region, and the production of lumber and lumber products constitutes the chief manufacturing industry.

Agriculture. On the lowlands and along the streams the soil is highly fertile, and these localities contain many highly developed farms. All crops of a cool, temperate climate are successful. Dairying is an important and growing industry and increased attention is being given to raising live stock for market. In some localities quantities of small fruits are grown for New England markets.

Fisheries. Catching and curing fish form one of the important industries. The chief centers are in Charlotte and Gloucester counties. Cod, herring, salmon, lobsters and sardines are taken in large quantities, and the streams in the northern part of the province are favorite haunts of game fish.

Other Industries. Coal is mined in small quantities for local consumption and large quantities of limestone and gypsum are quarried near St. John. Aside from industries directly connected with lumbering, manufactures are few and consist chiefly of the manufacture of furniture and making butter and cheese, an industry so closely allied to agriculture that it can scarcely be separated from it.

Transportation and Communication. The Intercolonial Railway, owned and operated by the Federal Government, connects the province with Nova Scotia on the east and the other Canadian provinces on the west, and there are branches connecting St. John and Fredericton with the main line. The Canadian Pacific and Grand Trunk Pacific extend through the province, the former, in connection with the Maine Central, forming a line to the United States. The

navigable rivers are fully utilized as a means of transportation, and a number of lines of steamers ply between St. John and ports in the United States and Nova Scotia, and with the chief ports of Great Britain.

GOVERNMENT. The chief executive is the lieutenant-governor, appointed by the governor-general of Canada for five years. He is assisted by an advisory council consisting of the heads of the various departments of the provincial government, and appointed by himself. The Legislature consists of an Assembly of 46 members. The judges of the courts are appointed by the Dominion Government for life.

EDUCATION. A system of free undenominational schools was established in 1871, and there are excellent elementary and secondary schools throughout the province. A normal school and a school for the deaf are maintained at Fredericton. Mt. Allison College (Methodist) is at Sackville, and there is a French College under the auspices of the Catholic Church at Memramcook.

CITIES. The chief cities are Fredericton, the capital; and St. John.

HISTORY. The coast of New Brunswick was explored by Sebastian Cabot in 1498. Later it formed a part of the French Province of Acadia. The first settlement within its borders was made at the mouth of the St. Croix River in 1604, by Pierre de Guast and Sieur de Monts, but the colony was soon abandoned. The Province of Acadia continued until 1713, when by the Treaty of Utrecht it came under control of Great Britain. In 1762 the first English settlement was made at Maugerville on the St. John River. Two years later a settlement was formed on the Miramichi by some Dutch farmers, and in 1783 and the years immediately following, a large number entered the province from the United States because they preferred to live under British rule. In 1784 New Brunswick became a separate province and so continued until the formation of the Federation in 1867, when it became a province of the Dominion of Canada.

New Brunswick, N. J., county seat of Middlesex Co., 31 m. s.w. of New York City and 23 m. s.w. of Newark, on the Raritan River at the head of navigation, the terminus of the Delaware and Raritan Canal, and on the Pennsylvania and Raritan River railroads. The Pennsylvania Railroad here crosses the Raritan River on a magnificent stone bridge and is carried through the city on a viaduct. Rutgers College, the Theological Seminary of the Dutch Reformed Church in America, organized in 1766; and the New Jersey State Agricultural and Mechanical College with the state model farms, which is connected with Rutgers, are located here. St. Agnes Academy, St. Mary's Orphan Asylum and Home for the Aged, and the Gardner A. Sage Library are other important institutions.

New Brunswick is a manufacturing city and has good shipping facilities by land and water. It has vast laboratories and extensive manufactories of India-rubber goods, paper hangings, carpets, hosiery, boots and shoes, harness, surgical supplies, knitting machines, musical strings, fruit jars, etc. The town was settled in 1681 and first called Prigmore's Swamp, then Inion's Ferry. The name was again changed in 1714 and called New Brunswick after the House of Brunswick. It was the scene of great activities during the Revolutionary War. In 1730 it was granted a royal charter and in 1784 was chartered as a city. Population in 1920, 32,779.

New'burgh, N. Y., a city of Orange Co., 57 m. n. of New York and 83 m. s. of Albany, on the west bank of the Hudson River, which here expands into Newburgh Bay, and on the Erie and the West Shore railroads. Steam ferries across the river connect the city with the New York Central & Hudson River and the Central New England railroads at Fishkill. An electric railway line connects with the village of Walden 12 m. northwest. The city occupies a commanding position on terraced slopes, rising over 300 ft. above the river, and has magnificent views of the Hudson High-

lands to the south and of the Catskill Mountains on the northwest. The city is an important port for various lines of Hudson River steamers, which ply between New York and Albany. Orange Lake, between Newburgh and Walden, is noted for its ice yachting and skating races. Newburgh is situated in an agricultural region, the adjacent country being widely known for its extensive dairies and the superior quality of butter produced in them.

The city, as viewed from the river, presents an attractive appearance with its broad streets, lined with trees and foliage, and fine public buildings. Washington Park is in the central part of the city, and Downing Park lies on a high plateau overlooking the city and the surrounding country. Clinton Square contains a statue of Gov. George Clinton. The educational institutions include the Newburgh Academy, St. Patrick's and Mount St. Mary's academies and a public library. The city also contains St. Luke's home and hospital, home for the friendless, home for children, a Y. W. C. A. Building, and a new Y. M. C. A. Building just completed, costing $90,000.

Newburgh is of considerable importance as an industrial center and has extensive manufactories of cotton and woolen goods, felt hats, silk goods, paper, laces, plush goods, mill machinery and agricultural implements. There are also foundries and machine shops, brickworks, carpet mills, tanneries and leatherette works. The shipyards are the largest along the Hudson. Large quantities of coal from Pennsylvania shipped to tidewater are here transferred to barges and coasting vessels.

Newburgh was first settled in 1709 by a colony of Germans from the Rhenish Palatinate, and was known as the "Palatine Parish of Quassaic." In 1750 the Germans had been replaced by people of Scotch and English descent, who renamed the place Newburgh after Newburgh, Scotland. The city occupied a prominent place in the history of the Revolutionary War and was the headquarters of the American army from March, 1782, until August, 1783. Washington made his headquarters at the Hasbrouck House, which was purchased by the state in 1849 and is now used as a museum for Revolutionary relics. It was here on May 27, 1782, that Washington wrote his famous letter of rebuke to Lewis Nicola, who had written him suggesting that he become king. On the grounds surrounding the headquarters is the Tower of Victory, erected by the United States and state governments to commemorate the close of the war. Newburgh was incorporated as a village in 1800 and chartered as a city in 1865. Population in 1920, U. S. Census, 30,366.

New'buryport", Mass., a city, port of entry and one of the county seats of Essex Co., 35 m. n.e. of Boston, on the Merrimac River, 3 m. from the Atlantic Ocean and on the Boston & Maine Railroad. The city stands on a declivity and commands a beautiful prospect. Shipbuilding is carried on to some extent. There is a considerable trade in coal brought to the city by coasting schooners. The chief manufactured products include celluloid collars and cuffs, boots and shoes, hats, combs, silverware, brushes, cordage, carriages, cottons and woolens. Among the city's noteworthy buildings are the Marine Museum, Anna Jacques Hospital and Old South Church, which contains the remains of George Whitefield. There are also homes for aged women and destitute children. In the upper part of the city the river is crossed by a chain bridge built in 1792, which was the first suspension bridge in America. Newburyport was settled in 1635 and was a part of Newbury until 1764, when it was incorporated as a town. It received a city charter in 1851. William Lloyd Garrison and Francis C. Lowell, who introduced cotton manufacturing on a large scale into the United States, were born here. Population in 1920, 15,618.

New Cal"edo'nia, an island in the South Pacific Ocean, in latitude 20° and 22° 30′ south and longitude 164° and 167° east. Its length from northwest to southeast is 220 m., and its breadth is 30

m. The surface is mountainous and is covered with a luxuriant vegetation, chiefly forests. The island belongs to France and is used as a penal colony. The population is about 52,000, most of whom are Papuans.

New Castle, Ind., a city and county seat of Henry Co., 20 m. s. of Muncie and 40 m. n.e. of Indianapolis, on the Blue River and on the Cleveland, Cincinnati, Chicago & St. Louis, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Ft. Wayne, Cincinnati & Louisville and other railroads. It is situated in an agricultural district and has natural gas, excellent water power and good transportation facilities. The chief manufactories include iron and brass works, a paper-box factory, a furniture factory, carriage and wagon shops, agricultural-implement works, brick and shovel works, a piano factory, paint works, flour mills, corn-shredder works and steel-bridge works. Population in 1920, U. S. Census, 14,458.

New Castle, Pa., a city and county seat of Lawrence Co., 50 m. n.w. of Pittsburgh, on the Shenango River at the mouth of the Neshannock Creek, and on the Pennsylvania, the Erie, the Baltimore & Ohio, the Pittsburgh & Lake Erie, the Buffalo, Rochester & Pittsburgh and other railroads. Interurban electric lines connect with the near-by towns and cities. New Castle is the commercial center of a fertile agricultural region, and bituminous coal, iron ore, limestone, fire clay and sandstone abound in the vicinity. The city is attractively situated, with broad and well-paved streets, and contains many beautiful residences surrounded by lawns and gardens. Cascade Park, not far from the city, is a noted pleasure resort.

Among the noteworthy public buildings are a city hall, public library, Y. M. C. A., a high school and several parish schools, and a well-equipped hospital. There are about 53 churches and missions. The extensive manufacturing industries of New Castle are represented by tin-plate works, blast furnaces, rolling mills, cement factories, nail factories and manufactories of fire brick, stoves, plows, boilers, machinery, paper, dynamite, steel wire and lumber products. There is also considerable trade in agricultural products, and stock raising and coal shipping are important.

New Castle was founded in 1812, incorporated as a borough in 1825 and chartered as a city in 1869. A revised charter was granted in 1889. Population in 1920, U. S. Census, 44,938.

Newcastle-upon-Tyne, a city and municipal county of England, the capital of Northumberland, situated on the left bank of the Tyne, 8 m. from its mouth. Among the buildings of prominence are the Guildhall, Moot Hall, Church of St. Nicholas, town hall, the postal and telegraph office, the Tyne and Royal theaters and the colleges of medicine and science connected with the University of Durham. The commerce of Newcastle is represented by handling the coal from the Northumberland and Durham regions, as well as lead and unrefined lead imported from Spain. The manufactures include soda, earthenware, vitriol, salt and other chemical products. The history of Newcastle-upon-Tyne dates from the occupation of the country by the Romans. It gained its name of Newcastle from the fact that Robert, son of William the Conqueror, began to build a castle here in 1080. Population, 266,671.

Newcomb, *Nu' kum,* **Simon** (1835-1909), an American astronomer and mathematician, born in Nova Scotia. He came to the United States when 18 years of age and graduated from the Lawrence Scientific School, Harvard, in 1858. In 1861 he became professor of mathematics in the United States navy, and in 1877, senior professor and director of the *Nautical Almanac.* He was secretary of the commission to observe the transits of Venus in 1871-1874 and 1882, and himself observed the transit of 1882 at the Cape of Good Hope. He also directed the observation of several eclipses. In 1897 he retired and devoted his time to scientific work. He edited the *American Journal of Mathematics,* taught in Johns Hopkins University, and was a

member of the Royal Academy and other honorable societies at home and abroad. He was president of the International Congress of Arts and Sciences at St. Louis in 1904. In 1874 he received the gold medal of the Royal Astronomical Society, in 1878 the Huygens medal, in 1890 the Copley medal, and in 1898 the Bruce medal of the Astronomical Society of the Pacific. His published works are numerous, among them several that are popular, including *Popular Astronomy, Astronomy for Everybody* and *The Stars.*

New England Confederation, the union between the four colonies of Plymouth, Massachusetts Bay, Connecticut and New Haven, 1643, for mutual help, and for a perpetual league, defensive and offensive, against the Indians, the Dutch, French and, if need be, against England. John Winthrop was the first president of the Confederation. For 20 years it was a great help to all the colonies of New England and it carried them victoriously through King Philip's War. However, internal dissensions and constitutional weakness led to its decline. It was dissolved in 1684.

New England, Council for, an organization established at Plymouth, England, for the planting, ordering, ruling and governing of New England in America. It was virtually a reorganization of the Plymouth Company of 1606 and was incorporated Nov. 3, 1620, with Ferdinando Gorges as the moving spirit. This new company granted to William Bradford the patent allowing the settlement by the Pilgrim Fathers. By the addition of Laconia, comprising parts of the present states of Maine and New Hampshire, in 1621, the territory of the new company extended from Long Island to the Bay of Fundy. This was distributed among 20 nobles.

Newfoundland, *Nu' fund land",* an island in the Atlantic Ocean, the tenth largest in the world. The name is applied to the whole British colony, including also the dependency, Labrador. The Strait of Belle Isle, about 12 m. wide, separates Newfoundland from Labrador, and Cabot Strait, 65 m. wide, separates it from Cape Breton Island. It is larger than Ireland, and nearly the size of Tennessee, its estimated area being 42,734 sq. m. The eastern coast is the nearest American point to Europe. Along its shores the surface is rocky and forbidding; the interior is more or less of a rough plateau, of which large sections are still unexplored. Timbered areas occur along the river valleys; marshes are frequent; and here and there the soil is fertile, yielding large tracts of grazing land and a fairly extensive farming area. Fishing is the chief industry, affording occupation to about 70,000 of the inhabitants. Its codfishery is the largest in the world; lobster, seal, salmon and herring rank next in importance. The manufactures are of minor importance; shipbuilding has long been carried on and there are several large sawmills. The trade with the United States and Canada is constantly on the increase.

A governor appointed by the Crown, a legislative council and a House of Assembly control the affairs of the island. The chief religious denominations represented are Roman Catholic, Episcopalian and Methodist. The educational system is not compulsory, and is almost entirely controlled by the Churches. The earliest history of Newfoundland connects with the discovery of the island by John Cabot in 1497, and the English settlements made on it later. By this time, however, the codfisheries had attracted the attention of the French and Portuguese, and contests for supremacy followed. By the Treaty of Utrecht, in 1713, the sole right of possession, excluding the isles of Miquelon and St. Pierre, was granted by France to England. The two isles were used as stations by the French fishing fleet. In 1832 Newfoundland received a representative government. St. John's, the capital, has a population of 29,504. The interior of the island is practically uninhabited. Population in 1911, 242,966.

Newfoundland Dog, a large spaniel, which derives its name from the island

in which it is native. It is a large, shaggy-coated dog, of mild disposition and benevolent expression. In color it is usually black, but it may be white with tan or black markings; often the head and ears are black, while the muzzle is white and a white line runs up the forehead. The shoulders are broad and powerful, the limbs strong and the tail long and shaggy; the eyes and ears are rather small, but its whole aspect is that of alert and intelligent interest. Its feet, like those of all spaniels, are webbed, and it is an active and excellent swimmer. It is fond of the sea, and many a boat carries its big Newfoundland, which proves to be no idle friend in case of danger. It has developed a determined instinct for life-saving and shows marvelous skill and sagacity in its powers of rescue. In sport the Newfoundland is a good retriever, an intelligent companion and an obedient assistant. For its usefulness to mankind it vies with the noble St. Bernard.

New Guinea, *Gin' y,* or **Papua,** *Pap' oo a,* a large island of the East Indian Archipelago lying north of Australia, from which it is separated by Torres Strait. It is slightly larger than the combined areas of California and Montana. The western portion belongs to Holland and the eastern since 1919 wholly to the British. Until recently the island had been slightly explored, but was known to have lofty mountains in the interior and to be inhabited by many warlike tribes wholly unacquainted with European civilization. The explorations carried on by British scientists have shown that the island is rich in animal life, and within its comparatively small area are found more varieties of birds and insects than are known in Australia. The people of New Guinea differ greatly in manner of life, and two tribes living only a few miles from each other often speak an entirely different language. Their principal food is sago; hunting and fishing are carried on and trading in pottery is practiced. Their houses and temples are thatched structures built upon piles and entered by means of a notched pole, which takes the place of a stairway. The population is estimated at 800,000.

New Hamp'shire, THE GRANITE STATE, one of the New England States and the most northerly of the thirteen original states, is bounded on the n. by the Province of Quebec, on the e. by Maine and the Atlantic Ocean, on the s. by Massachusetts and on the w. by Vermont and the Province of Quebec. The Connecticut River runs nearly the entire length of the western boundary and belongs to the state. The form is that of an irregular triangle with the northern apex cut off.

SIZE. The greatest length from north to south is 180 m. The greatest width is 100 m. and the area is 9341 sq. m., of which 310 sq. m. are water. New Hampshire is between Vermont and Massachusetts in size, making it the third of the New England States in area, and the 43rd state in the Union.

POPULATION. In 1920 the population was 443,083. Between 1910 and 1920 there was a gain of 12,511, or 2.9 per cent. There are 49.1 inhabitants to the square mile and the state ranks 41st in population.

SURFACE. The White Mountains, covering an area of about 1400 sq. m. and lying north of the center, form by far the most striking physical feature, not only of New Hampshire, but also of New England. Mt. Washington, 6286 ft., is, next to Mt. Mitchell in North Carolina, the highest peak of the Appalachian system (See WHITE MOUNTAINS). The northern part of the state is rugged and mountainous, but south of the White Mountains the region is characterized by low hills and broad valleys, with now and then an isolated dome of sufficient height to be styled a mountain.

RIVERS AND LAKES. The Connecticut, flowing along the western part of the state, is the longest and largest river and drains the western part. Its most important tributaries, going from the north southward, are the Upper and the Lower Ammonoosuc, the Mascoma, the Sugar and the Ashuelot. The Andros-

coggin drains the northeastern section; the Saco, the region farther south. The Salmon Falls River forms part of the boundary between Maine and New Hampshire and enters the Atlantic Ocean through the broad estuary of the Piscataqua, which forms the only harbor in the state. The Merrimac drains the south-central part of the state and is one of the most important streams.

Of the numerous mountain lakes, Winnepesaukee in the central part of the state, having an area of over 70 sq. m., is the largest and most important. Others in order of size are Umbagog, which is partly in Maine; Squam and Sunapee.

Scenery. For more than a century New Hampshire has justly been famous as the "Switzerland of America." The scenic features of the White Mountains, in which the Saco and the Pemigewasset form respectively the Crawford and Franconia notches, have been attractive to tourists ever since they were accessible, and they are known far and wide for their beauty and grandeur. Lake Winnepesaukee is remarkable for its irregular shores and the large number of islands it contains. The entire state is diversified by hill and valley, precipitous cliffs and mountain glens, through which flow sparkling streams with frequent cascades.

Climate. The state has a cool temperate climate; in the north the winters are long and severe, but in the south they are more mild. The summers are cool and pleasant, with rare hot days in which the thermometer may rise to 90° or thereabouts. The mean temperature of the year is 41°, 17° for the winter and 65° for the summer. The average rainfall is 40 inches. In the northern part of the state and among the White Mountains there is a heavy fall of snow and in some of the mountain gorges snow remains until midsummer.

Minerals and Mining. The state contains extensive ledges of granite, which is quarried in large quantities. It is also the leading state in the production of mica, the output being fully four-fifths of that quarried in the United States. Soapstone is also quarried in large quantities. Limestone, porphyry and other building stone are found.

Forests and Lumber. The lower slopes of the White Mountains are covered with forests of hard and soft woods. The hills and mountains in the northern part of the state were also heavily forested, but much of the timber there has been cut off. Lumbering, however, is carried on to a considerable extent for supplying local needs and raw material for numerous hardwood products. Although this industry is not so extensive as formerly, it is still fourth in the state.

Agriculture. Agriculture is one of the leading industries. Over 60 per cent of the land is under tillage. The farms are small, most of them being tilled by their owners, and diversified farming is largely practiced.

Soil. Along the streams the soil is deep and highly fertile, but on the uplands it is less productive. Throughout those deforested regions that have been cultivated good crops have been raised.

Products. Hay, oats and potatoes are the chief field products in the northern part of the state. South of the White Mountains garden vegetables and fruit are grown successfully. Dairy husbandry and poultry-raising are also important branches of agriculture throughout the state.

Manufactures. The numerous streams furnish abundant water power and manufacturing is the leading industry. Natural power sites have determined the location of many manufacturing centers. The most extensive of these are on the Merrimac, especially at Manchester and Nashua. Woolen and cotton mills are located so extensively along this stream in New Hampshire and Massachusetts that the Merrimac River is said to turn more spindles than any other river in the world. The manufacture of boots and shoes is the leading industry, with an annual output of about $23,500,000. The manufacture of cotton goods ranks second, with an annual output of about $23,000,000. The Amoskeag Corporation at Manchester is the largest sin-

gle establishment in the world for the manufacture of cotton goods. Woolens rank third with an output equaling in value about one-half of that of cotton manufactures. Lumber ranks fourth and is the oldest manufacturing industry, the first sawmill in New Hampshire having been erected in Portsmouth in 1635. The paper mills at Berlin and Lincoln are among the most complete in the United States. Wood pulp, hosiery and other knit goods, machinery and small wares in great variety are produced in large quantities. The total manufactures have a yearly value of about $200,000,000.

TRANSPORTATION AND COMMERCE. Portsmouth is the only seaport, but the state is well supplied with railways which are included under three systems,the Boston & Maine, the Grand Trunk and the Maine Central. These systems with connecting cross lines supply all towns, except those in the extreme north, with ample railroad facilities. A line of the Maine Central extends through Crawford Notch in the White Mountains, and a cogwheel railroad, the first of its kind, extends to the summit of Mt. Washington and is operated during the summer for the benefit of tourists. In the southern and central parts of the state electric lines connecting near-by towns are being extended year by year. Summer travel is heavy because thousands of people from Boston, New York and other cities seek relief in the hamlets and on the farms of this delightful region.

New Hampshire has an extensive commerce. Her manufactured products are found in the markets of the world and her farm products find ready sale in Boston and the manufacturing centers within the state. The imports consist chiefly of foodstuffs and raw material for manufactures.

GOVERNMENT. The governor and a council of five members, elected by popular vote, and a secretary of state, treasurer and commissory-general, chosen by joint ballot of the Senate and House of Representatives, constitute the executive department. The Legislature, or General Court, consists of the Senate of 24 members, distributed among 24 senatorial districts, and a House of Representatives, apportioned according to population. All cities and towns having 600 inhabitants are entitled to one representative for each legislative term. Cities and towns having less than 600 inhabitants are entitled to a representative for such part of the legislative term, occurring in each ten years, as their number of inhabitants is of 600; that is, a town having 360 inhabitants would have a representative in three of the five legislative terms occurring in each ten years. All members of the Legislature and all state officers are elected for two years.

The judicial department is vested in a Supreme Court consisting of one chief justice and four associate justices, and a Superior Court with one chief justice and four associate justices. The justices are appointed by the governor and confirmed by the council. The Supreme Court determines issues of law transferred from the other courts, and holds monthly sessions at Concord, except in the three summer months. The justices of the Superior Court hold court in the different counties during the year, and each county has a Probate Court. Municipal and local courts exist in the cities and larger towns.

EDUCATION. Public schools are under the direction of the superintendent of public instruction, who is appointed by the governor and confirmed by the council. The township is ordinarily the unit for the administration of rural schools. Cities and villages have excellent grade schools and high schools. Most of the revenue is provided by local taxation. Textbooks and school supplies are free, including those of the high schools. Attendance is compulsory from eight to fourteen years.

State normal schools are maintained at Plymouth and Keene, and the state agricultural college is at Durham. Dartmouth College at Hanover is one of the oldest and best known (See DARTMOUTH COLLEGE), and St. Anselm's College at

Manchester is a prominent Roman Catholic institution. Phillips Exeter Academy and St. Paul's at Concord are secondary schools of national reputation. In all there are 100 seminaries, academies and high schools within the state.

State Institutions. The hospital for the insane is at Concord and the orphans' home is at Franklin. The school for the feeble-minded is at Laconia. There is an industrial school at Manchester and the state prison is at Concord.

Cities. The chief cities are Concord, the capital; Manchester, Nashua, Portsmouth, Berlin, Dover, Rochester, Keene, Laconia, Somersworth and Franklin.

History. The territory between the Merrimac and the Sagadahoc was granted to John Mason and Ferdinando Gorges in 1622 under the designation of the Province of Maine. They divided this territory, Gorges taking the part on the east of the Piscataqua and Mason that on the west. Their titles were secured to them by new patents from the Council of Plymouth in 1629. The name New Hampshire first appears in the patent to John Mason, of this date. The first settlers, the Hiltons, came directly from England and located at Dover's Neck in 1623; other settlers also from England came to Little Harbor, locating at Dover Neck later in the same year. Very likely some of the early settlers before 1629 came from Hampshire, England. John Wheelwright founded Exeter in 1638. Hampton was settled as a Massachusetts grant in 1639.

In 1641 the towns along the Piscataqua and the coast formed a governmental union with Massachusetts Bay, and Exeter joined in 1643. The King dissolved this union in 1679 and established the Province of New Hampshire, which continued until 1686. The Dominion of New England, including the Province of New Hampshire and the Colonies, existed from 1686 to 1689. A second union of New Hampshire and Massachusetts existed from 1690 to 1692. In 1692 this union was dissolved and New Hampshire was thereafter an independent province, but from 1699 to 1741 it had the same governor as Massachusetts. New Hampshire men were engaged in all the important operations of the Revolution. The state adopted an independent but temporary constitution in 1776, and a permanent one in 1783. It ratified the Federal Constitution in 1788. In the Civil War it sent about 34,000 soldiers to the Union army. Consult F. B. Sanborn, *New Hampshire,* in the American Commonwealths Series.

Governors. Josiah Bartlett, 1793-1794; John Taylor Gilman, 1794-1805; John Langdon, 1805-1809; Jeremiah Smith, 1809-1810; John Langdon, 1810-1812; William Plumer, 1812-1813; John Taylor Gilman, 1813-1816; William Plumer, 1816-1819; Samuel Bell, 1819-1823; Levi Woodbury, 1823-1824; David Lawrence Morril, 1824-1827; Benjamin Pierce, 1827-1828; John Bell, 1828-1829; Benjamin Pierce, 1829-1830; Matthew Harvey, 1830-1831; Joseph Morrill Harper, 1831; Samuel Dinsmoor, 1831-1834; William Badger, 1834-1836; Isaac Hill, 1836-1839; John Page, 1839-1842; Henry Hubbard, 1842-1844; John Hardy Steele, 1844-1846; Anthony Colby, 1846-1847; Jared Warner Williams, 1847-1849; Samuel Dinsmoor, 1849-1852; Noah Martin, 1852-1854; Nathaniel Bradley Baker, 1854-1855; Ralph Metcalf, 1855-1857; William Haile, 1857-1859; Ichabod Goodwin, 1859-1861; Nathaniel Springer Berry, 1861-1863; Joseph Albree Gilmore, 1863-1865; Frederick Smyth, 1865-1867; Walter Harriman, 1867-1869; Onslow Stearns, 1869-1871; James Adams Weston, 1871-1872; Ezekiel Albert Straw, 1872-1874; James Adams Weston, 1874-1875; Person Colby Cheney, 1875-1877; Benjamin Franklin Prescott, 1877-1879; Natt Head, 1879-1881; Charles Henry Bell, 1881-1883; Samuel Whitney Hale, 1883-1885; Moody Currier, 1885-1887; Charles Henry Sawyer, 1887-1889; David Harvey Goodell, 1889-1891; Hiram Americus Tuttle, 1891-1893; John Butler Smith, 1893-1895; Charles Albert Busiel, 1895-1897; George Allen Ramsdell, 1897-1899; Frank West Rollins, 1899-1901; Chester Bradley Jordan.

1901-1903; N. J. Bachelder, 1903-1905; J. McLane, 1905-1907; C. M. Floyd, 1907-1909; H. B. Quinby, 1909-1911; R. P. Bass, 1911-1913; S. D. Felker, 1913-1915; R. H. Spaulding, 1915-1917; H. W. Keyes, 1917-1919; J. H. Bartlett, 1919-1921; A. O. Brown, 1921—.

New Ha'ven, Conn., the largest and most populous city of the state, county seat of New Haven Co., 36 m. s.w. of Hartford and 73 m. n.e. of New York, at the head of New Haven Bay, 4 m. from Long Island Sound, and on the New York, New Haven & Hartford and other railroads. There is also excellent interurban railway service. A number of steamship lines connect the city with New York and the various Sound ports, and aid in making New Haven a commercial and distributing center for a large section of the state. The city has an area of 23 sq. m. and is bordered on the east and west by the Quinnipiac and West rivers, which flow into the harbor. Near the city limits rise East Rock and West Rock, respectively 380 and 400 ft. in height, producing a very picturesque effect.

Parks and Boulevards. The streets of New Haven are broad and well kept and generally skirted with majestic elms, for which the city is noted and from which it has received the name of "The City of Elms." These elms were mostly set out about the close of the 18th century. "The Old Green" is a noted public square in the center of the city, about which the original settlers built their houses, and was for many years the public burial ground. The park system of New Haven comprises more than 1200 acres. Among the suburban pleasure resorts are East Rock Park with its driveways to the top, and crowned at its summit by a monument dedicated to the Connecticut soldiers and sailors of the Civil War; and West Rock Park with the famous Judge's Cave, the place of concealment of the regicides, Whalley and Goffe. Edgewood, Beaver Pond and a number of smaller parks are included within the limits of the city and add to its attractiveness.

Institutions. New Haven is the seat of Yale University, one of the foremost educational institutions of the country (See Yale University). It was chartered by the Colonial General Assembly of Connecticut as a collegiate school at Saybrook in 1701. In 1718, a year after the removal of the institution to New Haven, it was named in honor of Elihu Yale, an early patron who donated large gifts to the college. Other buildings and institutions include the State Normal School, Boardman Trade School, Hopkins Grammar School, founded in 1660, New Haven High School; New Haven, St. Raphael's and Grace hospitals, and St. Francis and New Haven orphan asylums. The public library contains many thousands of volumes and there are also valuable collections belonging to the New Haven Colony Historical Society, American Oriental Society, the Young Men's Institute and the Connecticut Academy of Sciences.

Industries. New Haven ranks first among the industrial centers of the state. The city contains large railroad repair shops, and there are extensive manufactories, which include those making firearms, hardware, clocks, watches, wagons and carriages, ammunition, rubber goods, automobiles and supplies, corsets, paper boxes, cigars, candies, webbing, edge tools, wire goods, musical instruments, pulp and paper, boilers, engines and foundry products. The city has also slaughtering and packing industries. There is considerable commerce and coastwise trade.

History. In 1638 a company of Puritans led by Theophilus Eaton and Rev. John Davenport, who had arrived from England the year previous, made a permanent settlement at the place called Quinnipiac by the Indians, who sold them a large tract of land, receiving in return an assortment of hatchets, knives, spoons and coats. Treaties were signed by both parties. The colony was later known as the New Haven Colony, and Theophilus Eaton was the first governor, the Indian name Quinnipiac being

changed to New Haven after Newhaven, England. This independent colony united with the Connecticut Colony in 1665 under the charter of 1662. In 1701 New Haven was made joint capital of the state with Hartford until 1873, when Hartford became the sole capital. Steamboat connection was opened to New York in 1815, the *Fulton* being the first steamboat on Long Island Sound. The first railroad entered the town in 1838. Among the historic features of the city are several churches built early in the 19th century, and the old burying ground containing the graves of Noah Webster, Roger Sherman, Benjamin Silliman, Timothy Dwight, Eli Whitney, Samuel F. B. Morse, Theodore Winthrop and other distinguished men formerly identified with the city. New Haven was first incorporated as a city in 1784, new charters being secured in 1881 and 1889. Fairhaven was annexed to New Haven in 1897. Population in 1920, 162,537.

New Hebrides, *Heb' ri deez,* a chain of islands in the Pacific Ocean, lying n.w. of Australia. The total area is approximately 5000 sq. m. The principal islands are Espiritu Santo, Efate, Amboym, Aragh Aragh, Aoba, Maewo and Epi, or Tasiko. The fertile soil yields fruit in abundance, but the climate is unhealthful. The natives respond to civilization, and several of them have been christianized and are able to read and write. Population, about 50,000.

New Ibe'ria, La., a city and the parish seat of Iberia Parish, about 125 m. w. of New Orleans, on the Bayou Teche, at the head of navigation, and on the Southern Pacific and other railroads. The leading manufactories include knitting mills, shipyards, foundries, machine shops and manufactories of cottonseed products, cypress lumber, cypress cisterns and tanks, sash, doors and blinds, wagons, carts, common and pressed brick, soap and tobasco sauce. On Avery's Island, in the near vicinity, there are valuable deposits of salt. New Iberia is in a section made famous as the scene of a part of Longfellow's *Evangeline.* Within the city are several features of interest, including a Federal post office, fine city hall, large public market and a public library. Population in 1920, U. S. Census, 6,278.

New Jersey, *Jur' zy,* THE GARDEN STATE, one of the South Atlantic States, is bounded on the n. by New York, on the e. by the Atlantic Ocean, on the s. by Delaware Bay and on the w. by Delaware and Pennsylvania. The Delaware River forms the entire western boundary line.

SIZE. The greatest length from north to south is 166 m., the average width is 50 m. and the area is 8224 sq. m., of which 710 sq. m. are water. New Jersey is about twice the size of Connecticut and a little larger than Lake Ontario. It is about one-fourth the size of Maine and is the 45th state in the Union in area.

POPULATION. In 1920 the population was 3,155,900. From 1910 to 1920 there was a gain in population of 618,733, or 24.4 per cent. There are 420 inhabitants to the square mile and the state's rank in population is 11.

SURFACE. According to surface, New Jersey is divided into four divisions, known respectively as the Appalachian Mountains and Valley, the Highland Belt, the Piedmont Plain and the Coastal Plain. The Appalachian region includes the Kittatinny Mountains and Valley and occupies the northwestern portion of the state. The Kittatinny range is low, nowhere exceeding 1800 ft. in altitude. The range is rocky and rugged and is heavily wooded. The famous Delaware Water Gap is formed by that river's cutting its way through these mountains. The Kittatinny Valley to the southeast of these ranges is from 10 to 13 m. wide and lies between the Kittatinny range and the highlands. It contains high, rolling hills, including smaller valleys, and is a beautiful and highly developed farming section.

The Highland Belt crosses the state from southwest to northeast. It consists of several parallel ridges from 1200 to 1400 ft. high, and separated by long, narrow valleys which are occupied by

farms. The ridges are nearly uniform in height and in the north include several lakes.

The Piedmont Plain lies to the southeast of the highlands and is nearly as large as the two other divisions combined. It contains a number of ridges formed by the outcropping of trap rock, the most remarkable being those known as the Palisades (See PALISADES). South of the Piedmont Plain and occupying the agricultural part of the state is the Coastal Plain. This is characterized by hills having gentle slopes and with a general trend toward the Atlantic and Delaware Bay. Navesink Highlands and Mt. Pleasant Hills are the highest elevations in this division.

RIVERS AND LAKES. The rivers are short and small. The western part of the state is drained into Delaware Bay. The Passaic, Hackensack and Raritan, flowing into Newark Bay, are the most important streams. The rivers in the southern part of the state are characterized by large estuaries which enter the Atlantic.

There are a number of mountain lakes in the northern part of the state, the most important being Hopatcong, Greenwood, Splitrock, Macopin, Wawayanda, Green and Budd's.

CLIMATE. The winters are mild and the summer heat is tempered by sea breezes, so that the state has a mild, temperate climate. The annual rainfall is about 49 inches and the mean temperature is 49° in the highlands and 53° along the coast.

MINERALS AND MINING. Iron ore occurs in the northern part of the state and there are a number of mines from which magnetic ore is taken. While the quantity is not large, relatively, the output of these mines is important because of the use made of the ore in the production of steel. There are important zinc mines in Sussex County, and New Jersey is the second zinc-producing state in the Union. Fire clay and clay suitable for pottery and terra cotta and brick occur in large quantities along the Raritan River, and along the Delaware and Hackensack. Granite, gneiss, sandstone, slate and other building stones are quarried, and there are large deposits of rock in Warren County suitable for the manufacture of cement.

AGRICULTURE. Most of the land except that covered by forests is suitable for agriculture. The farms are small, averaging about 82 acres, and intensive farming is generally practiced.

Soil. The soil is generally fertile, though of different varieties in the different parts of the state, thus giving opportunity for a great variety of crops.

Products. Apples and peaches are raised in large quantities in the northern part of the state and pears in the central part, potatoes are an important crop in the central part. The southern section is known for its strawberries, raspberries and blackberries. Cranberries grow profusely in the swamp lands, and large areas are covered with native huckleberries. Grapes, currants and cherries are also extensively cultivated. The proximity of New Jersey to New York, Philadelphia and Baltimore makes this state an ideal location for truck farming, and large areas are devoted to this industry, tomatoes, melons and garden vegetables being produced in great quantities.

The leading cereal crops are corn, oats, rye and wheat. New Jersey is known for the excellent quality of its sweet potatoes, and large quantities are shipped to the Northern markets every year. Dairying is practiced to a considerable extent, and near New York raising flowers for market is a thriving industry.

FISHERIES. The coast waters around the mouth of the Raritan River and Delaware Bay contain large oyster beds, and other beds are found in the Maurice River. The income from the oyster fisheries is about $2,275,000 a year. Clams, shad, sturgeon and other fish are also taken in paying quantities.

MANUFACTURES. The chief manufacturing centers are around New York and Philadelphia. New Jersey leads in the manufacture of silk and is second in the manufacture of pottery. Leather,

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jewelry, woolen goods, chemicals in great variety, rubber goods, machinery and locomotives are manufactured to meet the demands of an extensive market. Camden is known for its shipbuilding and Elizabeth for the manufacture of sewing machines. Bricks and terra cotta are made about Perth Amboy, and some glass is made in the southern part of the state. Considering its area and population, New Jersey ranks as one of the leading manufacturing states.

TRANSPORTATION AND COMMERCE. The state contains over 2300 m. of railroad and over 1200 m. of electric lines. The principal railroad systems are the Pennsylvania, the West Jersey & Sea Shore, the Central Railroad of New Jersey, the Delaware, Lackawanna & Western, the Philadelphia & Reading and the Lehigh Valley. There are a number of other companies operating lines within the state. The great railroad centers are at Jersey City and other points opposite New York, where many trunk lines have their Eastern terminals. The state is well supplied with railways and every locality has quick and frequent transportation for its products. The docks opposite New York practically form a part of New York Harbor, and in them are found ships from all parts of the world. The Delaware and Raritan Canal connects Jersey City with Phillipsburg, thence with the canal system of Pennsylvania.

The trade between the farms of New Jersey and the markets of New York and Philadelphia and other cities is extensive. A considerable part of the foreign trade of New York City is carried through Jersey City, so that the state as a whole has a more extensive commerce than any other state of the same population.

The shores of New Jersey are especially attractive. These, combined with the salubrious climate, have been the means of the upbuilding of a number of seaside resorts. Some of these have for many years enjoyed a national reputation. Among them are Cape May, Asbury Park and Atlantic City. Prosperous resorts are found among the mountainous lakes in the northern part of the state. The most important of these are at Budd's, Hopatcong and Greenwood lakes.

GOVERNMENT. The present constitution was adopted in 1844 and revised in 1875. The governor is elected by popular vote for three years. The state treasurer and comptroller are chosen for three years at a joint session of the two houses of the Legislature. The governor with the approval of the Senate appoints the secretary of state, attorney-general, clerk of the Supreme Court, clerk of the Court of Chancery, superintendent of public instruction and keeper of the state prison. These appointments are for five years. The Legislature consists of a Senate of 21 members and a House of Representatives of 60 members. Senators are chosen for three years, representatives for one year.

The judicial department consists of law courts and courts of equity consisting of a Supreme Court, Court of Errors and Appeals, Court of Chancery, Circuit Courts, Prerogative Court, Impeachment Court, Court of Pardons and inferior courts. The chancellor and judge of the Supreme Court are appointed by the governor for a term of seven years.

EDUCATION. The public schools are managed by a state board of education appointed by the governor and confirmed by the Senate for five years. The secretary of this board exercises the duties and powers of a state superintendent of public instruction. The board of education appoints a county superintendent for each county. All cities and towns maintain excellent systems of graded schools, and kindergarten courses and manual-training schools are common. State normal schools are maintained at Trenton and Upper Montclair. The state agricultural school is connected with Rutgers College at New Brunswick.

The higher educational institutions not under control of the state are: Princeton University at Princeton; Stevens Institute of Technology at Hoboken; Seton

Hall College at South Orange; Centenary Collegiate at Hackettstown; Blair Presbyterian Academy at Blairstown; Pennington Seminary at Pennington; Lawrenceville School at Lawrenceville; Peddie Institute at Hightstown; Drew Theological Seminary at Madison.

State Institutions. The hospitals for the insane are at Trenton and Morristown. There is a village for epileptics at Skillman and there are homes for feeble-minded women and children at Vineland. The school for the deaf is at Trenton, the state prison is at Trenton and the reformatory is at Rahway. There is a home for boys at Jamesburg and one for girls at Trenton. A soldiers' home is at Kearny, and there is a home for disabled soldiers, sailors, marines and their wives at Vineland.

Cities. The chief cities are Trenton, the capital; Jersey City, Camden, Elizabeth, Hoboken, Newark, New Brunswick, Paterson and Orange.

History. New Jersey was named to commemorate the defense of the Isle of Jersey, in the English Channel, by Carteret. The first party of permanent homeseekers (Hollanders) in 1623 built Ft. Nassau (Gloucester). Later came Swedes and English. These three peoples fought continuously for supreme control till, in 1664, Charles II granted to the Duke of York the land from Cape May to Nantucket. Given, in turn, to lords Berkeley and Carteret, they divided it into East and West Jersey. In 1674 West Jersey was bought by a syndicate of Quakers, and in 1682 Quakers bought East Jersey. In 1702, however, the two sections were reunited. In the Revolution, for which it furnished over 10,000 men, New Jersey was the scene of important action. Later it fought against a strong central government; yet it early ratified the Federal Constitution. Universal suffrage was practiced from 1776 to 1807. Slavery was an institution till 1820. After that it was gradually abolished. For the Union army about 90,000 men were furnished. Since the Civil War, taxation and the control of corporations have been important issues.

Consult Lee's *New Jersey as a Colony and as a State.*

Governors. William Livingston, 1776-1790; William Paterson, 1790-1793; Richard Howell, 1793-1801; Joseph Bloomfield, 1801-1802; John Lambert, 1802-1803; Joseph Bloomfield, 1803-1812; Aaron Ogden, 1812-1813; William Sandford Pennington, 1813-1815; Mahlon Dickerson, 1815-1817; Isaac Halsted Williamson, 1817-1829; Garret Dorset Wall, 1829; Peter Dumont Vroom, 1829-1832; Samuel Lewis Southard, 1832-1833; Elias P. Seeley, 1833; Peter Dumont Vroom, 1833-1836; Philemon Dickinson, 1836-1837; William Pennington, 1837-1843; Daniel Haines, 1843-1844; Charles C. Stratton, 1845-1848; Daniel Haines, 1848-1851; George Franklin Fort, 1851-1854; Rodman McCauley Price, 1854-1857; William Augustus Newell, 1857-1860; Charles Smith Olden, 1860-1863; Joel Parker, 1863-1866; Marcus Lawrence Ward, 1866-1869; Theodore Frelinghuysen Randolph, 1869-1872; Joel Parker, 1872-1875; Joseph Dorsett Bedle, 1875-1878; George Brinton McClellan, 1878-1881; George Craig Ludlow, 1881-1884; Leon Abbett, 1884-1887; Robert Stockton Green, 1887-1890; Leon Abbett, 1890-1893; George Theodore Werts, 1893-1896; John William Griggs, 1896-1898; Foster MacGowan Voorhees, 1898; David O. Watkins, 1898-1899; Foster MacGowan Voorhees, 1899-1902; Franklin Murphy, 1902-1905; Edward Casper Stokes, 1905-1908; John Franklin Fort, 1908-1911; Woodrow Wilson, 1911-1913; James F. Fielder, 1914-1917; Walter E. Edge, 1917-1920; E. I. Edwards, 1920—.

New London, Conn., port of entry and one of the county seats of New London Co., 51 m. e. of New Haven and 13 m. s. of Norwich, the other county seat, on the Thames River, 3 m. from its entrance into Long Island Sound, and on the New York, New Haven & Hartford and the Central Vermont railroads. It has regular steamer connection with New York and all the Sound ports. The harbor is one of the best in the United States and is defended by forts Gris-

wold and Trumbull. Above the city on the east side of the river is a United States naval station. New London is delightfully situated and is a popular summer resort. It had formerly a large whaling and sealing trade which is still of considerable importance. It is also a distributing center for a large amount of the imports used in the southeastern part of the state.

The manufacturing interests of New London are represented by silk, woolen and sewing-silk mills, foundries, oil refineries, machine shops, a cotton-gin factory, bed-quilt mills, printing-press works and a furniture factory. Shipbuilding is an important industry. The annual Yale-Harvard boat race is rowed on the Thames. Among the historic places of interest are the Hempstead House, one of the oldest houses in Connecticut; the little schoolhouse where Nathan Hale was once a teacher; and the Old Town Mill, built in 1646. The city is the seat of the New London County Historical Society and Library.

New London was founded in 1646 by John Winthrop, the younger, and was known by the Indian name of Naumeag. In 1658 the name was changed to New London. Prior to the Revolution it had established trade with the near-by colonies and the West Indies. On Sept. 6, 1781, Benedict Arnold, at the head of a large British force, attacked New London, destroyed the wharves and many of the buildings and killed a number of the people. A shaft 127 ft. high has been erected at the place where the massacre occurred. The town was incorporated in 1784. Population in 1920, 25,688.

New Mad'rid, Battle of. See ISLAND NUMBER 10.

New'man, John Henry (1801-1890), a Roman Catholic prelate, born in London. At the age of 16 he entered Trinity College, Oxford, received his degree there in 1821 and was elected a fellow of Oriel College in 1822. Two years later he was ordained curate of St. Clement's Church, Oxford, the following year being vice-principal of St. Alban's Hall and in 1826 tutor in Oriel. Two years later he became vicar of St. Mary's. He traveled in southern Europe during 1832-33, and on his return became associated with Keble and Pusey in the Oxford Movement (See OXFORD MOVEMENT). Newman at this time advocated the need of a visible head of the Church and of sacraments and rites, and declared that the Roman Catholic Church and the Papacy were contrary to the teachings of Christianity. He propagated these ideas through *Tracts for the Times*. After a period of religious doubt and struggle, he retracted his attacks on Catholicism, and in 1845 joined the ranks of the Catholic Church. Leaving Oxford early in 1846, he spent a year in Rome, where he was ordained to the priesthood. In 1854 he became rector of the Roman Catholic University of Dublin, remaining here for four years. In 1878 he was elected honorary fellow of Trinity, having regained the esteem that he had lost when he deserted the Anglican Church. The following year Pope Leo XIII created him a cardinal. He continued to reside in England, and died in Birmingham.

Newman's literary masterpiece, a volume of lectures entitled *Idea of a University,* was the outcome of his residence in Dublin. His religious autobiography, *Apologia pro Vita Sua,* won for him the high regard of entire England. *The Dream of Gerontius* deals with a soul's yearning for truth. Best loved of all his verse is the noble hymn, *Lead, Kindly Light.* Newman's mind was lofty and sweet, and his prose style, at its best, was more nearly perfect than that of any other English writer of his time, being pure, melodious and beautifully clear.

New Mex'ico, one of the Mountain States, is bounded on the n. by Colorado, on the e. by Oklahoma and Texas, on the s. by Texas and Mexico and on the w. by Arizona.

SIZE. Its length from north to south is 400 m., and its width from east to west is 358 m. The total area is 122,634 sq. m., of which 131 sq. m. are water. New Mexico is about three times the size of Ohio, a little less than Utah and Virginia combined and the fourth state in area.

Population. The population in 1920 was 360,350. The decade from 1910 to 1920 showed an increase of 33,049, or 10.1 per cent. There are 2.9 inhabitants to the square mile. In 1919 the population was estimated as 425,000.

Surface. The altitude of the state as a whole is high, no part of it being below 3000 ft. The Rocky Mountains enter the state from the north, and the Sangre de Cristo, the main range east of the Rio Grande, extends as far as Santa Fe, which has an altitude of 7000 ft. East of the Sangre de Cristo there are several minor ranges, but the general slope is towards the east and south. In the southeastern part of the state is an arid table-land known as the Llano Estacado, or Staked Plains. West of the Pecos River and south of the center of the state is a group of mountain ranges, among which the Sacramento Mountains and the Guadalupe Mountains are the most prominent, but all are lower than the main ranges of the Rocky Mountains in the north. The Rio Grande divides New Mexico into two unequal divisions by a narrow valley extending across the state from north to south. The portion west of this valley consists of a high plateau extending southward to the Gila River. Throughout the plateau are evidences of former intense volcanic activity, and near its southern boundary are numerous extinct volcanoes and lava beds. Mt. Taylor (11,389 ft.), in the northern part of Valencia County, is surrounded by some of the most wonderful volcanic buttes in the world. In the south-central part of the state east of the Rio Grande is the basin of a former lake, in which are numerous dunes of so-called white sand, but which are formed of almost pure granular gypsum. A distinctive feature of New Mexican scenery is the mesa, or flat-topped bluff. On some of these, Indian pueblos are still found.

Rivers. The Rio Grande is the largest river. Passing through the center of the state, it receives several unimportant tributaries, such as the Chama, Jemez and Rio Puerco, and crosses the New Mexican line a little west of the center of the southern boundary. Other important rivers are the Pecos, draining the southeastern part; the Canadian, carrying the waters of the eastern slope of the Rocky Mountains; and the westward-flowing rivers, the San Juan, the Rio San Francisco, the Gila and the Rio Puerco of the West. Despite deficient rainfall the streams of New Mexico are unusually numerous, though one characteristic of them is that they often run totally dry, either by evaporation, use in irrigation or broken stratification.

Climate. The climate is very healthful, due to the southern latitude, the low degree of humidity and the lofty elevation, and the state has grown famous as a health resort, especially for those afflicted with pulmonary disorders. Although the heat sometimes is oppressive during the summer months, the nights are always cool. The mean temperature of the different sections varies from about 42.4° to 65°. The rainfall is heaviest between May and August, and averages between 15 and 17 inches; as a result of deficient precipitation, irrigation is necessary.

Minerals and Mining. The Spaniards and Mexicans were aware of the existence of valuable mineral deposits in the state, but little silver mining was carried on until 1881, when the Lake Valley mines were first worked. Gold, copper and zinc deposits are found, principally in the counties of the southwest. Lead is produced in small amounts in connection with the zinc industry. Coal in all forms, from lignite to anthracite, is by far the most important mineral product, and is deposited in widely distributed areas. Other minerals are salt, gypsum (of which there is practically an inexhaustible supply, as yet unworked), clay, soda, potash, ocher, marble, mica, tungsten and iron. Among precious stones are turquoises, opals, garnets and chalcedony.

Forests. The timber lands cover the slopes of several of the mountain ranges, chiefly in the western part. The principal trees are pine, oak, birch, cedar, maple, juniper and piñon. Many of the

forest areas are now government reservations. In the southern and southeastern counties is the huge cactus, or saguaro; also groves of walnut and oak. Along the rivers are cottonwoods and a few sycamores and willows.

AGRICULTURE. Raising live stock is the most important branch of agriculture, and large numbers of horses, cattle, sheep and swine are shipped each year. New Mexico is also one of the leading wool-producing states. In some regions dry-farming is very successful, and in 1919 over 2,000,000 acres were under tillage by this method. In the river valleys and the irrigated districts a great variety of crops, including alfalfa, sugar beets, garden vegetables and fruits may be found. The completion of large government reclamation projects from year to year is continually increasing the acreage open to irrigation. The chief field crops are hay, corn, wheat, oats, barley and potatoes. Sugar beets have been introduced and cantaloupes, cabbages, onions, cauliflowers and turnips are grown. In the irrigated districts grapes, apples, pears, quinces, plums and apricots, all of excellent quality, are found.

MANUFACTURES. The manufacturing industries of New Mexico have not been developed to any great extent. They are represented by the construction of railway cars and general shop and repair work, the manufacture of flour and gristmill products, wool-scouring plants for the production of wool, the manufacture of timber and lumber products and the printing and publishing of newspapers and periodicals. There are also plants for the smelting and refining of ore, several establishments for canning fruit, beet-sugar factories and distilleries.

TRANSPORTATION. The railway mileage exceeds 4000 and is increasing from year to year. The main trunk lines are the Santa Fe and the Southern Pacific. The former crosses the northern boundary some distance east of the central point and extends in a southwesterly direction to Albuquerque, thence westward into Arizona. The Southern Pacific enters the state at El Paso and extends westward across the southern part. The Rock Island extends in a southwesterly direction from about the center of the eastern boundary to El Paso, thence westward to Benson, Ariz., where it forms a junction with the Southern Pacific. From Santa Rosa to Benson the line is known as the El Paso & Southwestern. State highways are being extended to every part of the state, encouraging development of its resources.

GOVERNMENT. The present constitution was adopted in 1911, and has been four times amended. The executive officers, who are elected for two years, are a governor, lieutenant-governor, secretary of state, state auditor, state treasurer, attorney-general, superintendent of public instruction and commissioner of public lands. The Legislature consists of a Senate and a House of Representatives. The Senate has 24 members, elected for four years; the House, 49 members, elected for two years. The judicial department is made up of a Supreme Court of three justices, elected for eight years; eight District Courts, with one judge to each district, elected for six years; and Probate Courts in each county. The constitution provides for a state corporation commission of three members, elected for six years. This commission charters and regulates corporations other than municipal, and is empowered to fix rates of public service charges.

EDUCATION. The illiteracy which was common among the inhabitants of New Mexico who were of Spanish descent, is gradually disappearing through the establishment of schools, the increased length of their terms and a general improvement of the public school system. The law now requires the use of English in the schoolroom. There is a board of education at the head of the system, a state superintendent, local boards in the incorporated cities, a superintendent of schools for each county and three directors of each school district into which the country is divided. The University of New Mexico is at Albuquerque. Other institutions are the college of agriculture and mechanic arts at Mesilla Park, a

normal school at Silver City, a normal university at Las Vegas, a military institute at Roswell and a school of mines at Socorro. Indian training schools are maintained by the government, and religious denominations and missions also support several schools.

STATE INSTITUTIONS. There is an asylum for the insane at Las Vegas, an institute for the blind at Alamogordo, a penitentiary and an asylum for the deaf and dumb at Santa Fe, a miners' hospital at Raton and a reform school at Springer. Private hospitals and charitable institutions have also received appropriations from the State Legislature. The government sanatoriums at Ft. Stanton and Ft. Bayard are especially for sailors and soldiers afflicted with pulmonary tuberculosis.

CITIES. The important cities are Santa Fe, the capital; Albuquerque, Las Vegas, Raton, Roswell, Deming, Las Cruces, Carlsbad and Tucumcari.

HISTORY. There are traces of early inhabitation of New Mexico by sedentary and nomadic Indian tribes, and in 1537 the Spanish explorers reached the territory, which they named New Mexico in 1581. During the 17th century there were frequent revolts by the Indians against Spanish authority. In 1821 Mexico overthrew the Spanish power, and New Mexico was made a province of the former. It became a territory in 1824 and a department in 1836. New Mexico was ceded to the United States in 1848 by the Treaty of Guadalupe Hidalgo. The territory was organized in 1850; frequent changes in its boundaries were made later. Attempts to secure statehood were begun as early as 1850. Arizona opposed the bill passed by Congress in 1906, which provided for the admission of New Mexico and Arizona as one state, and the status of the territory remained unchanged until 1910. In that year the enabling act providing for the admission of New Mexico as a state was approved by Congress, and in August, 1911, the resolution to admit the state was approved. Consult H. H. Bancroft's *Arizona and New Mexico*.

GOVERNORS. (Under the United States.) James S. Calhoun, 1851-1852; Edwin V. Sumner, U. S. A. Commandant, 1852; John Greiner, 1852; William C. Lane, 1852-1853; David Merriwether, 1853-1857; Abraham Rencher, 1857-1861; Henry Connelly, 1861-1865; W. E. M. Arny, 1865-1866; Robert B. Mitchell, 1866-1869; William A. Pile, 1869-1871; Marsh Gidding, 1871-1875; William G. Ritch, 1875; Samuel B. Axtell, 1875-1878; Lewis Wallace, 1878-1881; Lionel A. Sheldon, 1881-1885; Edmund G. Ross, 1885-1889; L. Bradford Prince, 1889-1893; William T. Thornton, 1893-1897; Miguel A. Otero, 1897-1906; Herbert J. Hagerman, 1906-1907; J. W. Reynolds, 1907; G. Curry, 1907-1909; W. J. Mills, 1909-1912; W. C. McDonald, 1912-1917; W. E. Lindsey, 1917-1919; O. A. Larazollo, 1919-1921; M. C. Mechen, 1921—.

New Mexico, University of, at Albuquerque (1889). Preparatory, normal and collegiate departments were opened in 1892. Schools of commercial work, science, music and art have since been added. The Hadley Climatological Laboratory is connected with the university and is investigating particularly the climatic influence of the dry plateau regions upon health. The university has been endowed by the grant of 243,000 acres of public and 150,000 acres of saline lands. The enrollment is proportional to the population of the state and is increasing from year to year.

New Orleans, *Or' le anz,* **La.,** a seaport, county seat of Orleans Parish and metropolis of the South, on the east bank of the Mississippi River, 107 m. from the end of South Pass Jetties, on the Gulf of Mexico, 141 m. s.w. of Mobile, and on the Southern Pacific, the Louisville & Nashville, the Texas & Pacific, the Illinois Central, the St. Louis & San Francisco, the New Orleans & Northeastern, the Southern, the Yazoo & Mississippi Valley, the Shreveport & Red River Valley and other railroads. Deep-sea shipping reaches New Orleans through the mouth of the Mississippi River. The port, which is noteworthy

for its public ownership, extends through the Parish of Orleans and parishes of Jefferson and St. Bernard for 17 m. on the east bank and 22 m. on the west bank of the Mississippi River. Many lines of steamers give direct connection with all European ports, Central America, Havana, Tampa, Porto Rico, Panama and the Orient, and coastwise service to Atlantic coast ports. There is also large steamer traffic to all parts of the Mississippi Valley. The Carondelet and New canals give access to Lake Ponchartrain, a lake 40 m. long and 20 m. wide, about 3 m. northwest of the city. The total area of New Orleans is 196 sq. m. within the municipal limits, but the city proper covers about 40 sq. m. The city contains over 210 m. of street railways.

New Orleans is one of the largest cotton ports in America, and is the principal center of the country for the manufacture of cottonseed products and for rice and coffee milling and molasses and sugar refining. It is also a manufacturing city of no mean importance. The city is now known as a modern New Orleans. A great drainage system with underground canals has been constructed to carry off the surface water from the city to Lake Borgne. A modern sewerage system has also been installed, and the new waterworks plant is one of the best in the country. The cost of the waterworks and filtration plant was about $7,000,000.

Parks and Boulevards. The site of the city is on a level plain only 10 ft. above sea level. The lower parts of the city are about 10 ft. below the river at high-water mark, but are protected by levees. The central thoroughfare and shopping center is Canal Street, which divides the old French district from the newer parts of the city. All street-car lines center here. The original city was bounded by the river and Rampart, Canal and Esplanade streets. St. Charles Avenue, Audubon Place and Prytania Street are among the handsome residential streets. The memory of French and Spanish dominion is retained in the names of many of the streets, which are wide and profusely shaded with tropical plants and flowers. City Park of 216 acres lies between the city and Lake Ponchartrain; Audubon Park, once a sugar plantation, was purchased by the city in 1871. In 1884 the Cotton Centennial Exposition was held on this site. Jackson Square is still known by its older name of the Place d'Armes and is associated with nearly all important events in the colonial history of Louisiana.

On the farther side of Lake Ponchartrain, adjacent to the city, are the lake and coast resorts; the towns of Covington, Abita Springs and Mandeville are located in what is known as the "Ozone Belt." The cemeteries include St. Louis No. 1, St. Roch's Campo Santo, Metairie and Greenwood. There is also a National cemetery at Chalmette, a few miles from the city, in which 12,000 Union soldiers of the Civil War are buried.

Public Buildings. Among the imposing and historical buildings are the city hall, built in the style of an Ionic temple; new courthouse; the Cotton Exchange; the Louisiana Sugar Exchange; the Produce Exchange; the Hennen, the Maison Blanche and the Tulane Newcomb buildings; the United States Immigrant Station, finished in 1913; the St. Charles Hotel, the third of the name on the same site; the De Soto Hotel; the post office; and the Customs House, renowned for its "marble room." The cornerstone of this building was laid by Henry Clay in 1847. The history and romance of New Orleans are united in the French Quarter of the city. The Cabildo, or government house, was named from the council that sat here during Spanish rule and was built in 1795. The French Market is also one of the interesting sights of the city. St. Louis Cathedral, first built in 1718, St. Patrick's and the First Presbyterian are among the many handsome churches of the city. The famous Mardi Gras, held in February each year, is the most elaborate carnival celebration in the world.

Institutions. Among the higher institutions of learning in the city are Tulane University (See Tulane Uni-

VERSITY OF LOUISIANA), College of the Immaculate Conception (Jesuit), Loyola College, Newcomb College and New Ursuline School. Among the higher schools for negroes are Leland University (Baptist), Straight University (Congregational), New Orleans University (Methodist) and Southern University, the last supported by the state. About 30 of the 112 public school buildings were a bequest of John McDonogh, whose life was intimately connected with that of the city. The libraries include a Carnegie library, Howard Memorial, the Athenée Louisiannaise and the Union Franchaise. There are also a state museum and Delgado Art Museum. The benevolent and charitable institutions include a large charity hospital and Milliken Memorial Hospital for children, which are supported by the state; homes for the aged; various asylums; orphans' homes; Soldiers' Home of Louisiana for Confederate veterans; St. Vincent's Home for Protestant widows; and Kingsley House, which is modeled after Hull House in Chicago.

INDUSTRY AND COMMERCE. The largest industry is sugar refining. The total capacity of the several sugar-refining plants is about 24,000 barrels per day. The oyster beds and fisheries of Louisiana represent one of the state's richest resources. Among other leading manufactories are molasses refineries, canneries, coffee roasters, burlap-bag factories, formerly distilleries, shoe factories, lumber and shingle mills, manufactories of lard compound, cottonseed oil, furniture, refrigerators, boilers, drugs, boats, acids, cigars, mahogany veneer, extracts, brass goods, art pottery, galvanized tanks and paint. New Orleans is an extensive banana market, and in recent times the city has become a great petroleum-oil market. There are large car shops and general construction plants.

HISTORY. In 1718 the city was founded by Jean Baptiste Le Moyne, Sieur de Bienville, then governor of Louisiana, and named in honor of the Regent of France. In 1722 New Orleans was made the capital of the Louisiana Province. On Nov. 30, 1803, occurred the transfer of Louisiana to France. Twenty days later the keys of the city were again transferred to United States commissioners, and American rule was begun. During the Civil War, New Orleans suffered severely, but after the Reconstruction Period the city had a rapid growth. New Orleans has the commission form of government. Population in 1920, U. S. Census, 387,219.

New Orleans, Battle of. This was the last battle of the War of 1812, fought Jan. 8, 1815, between Americans, under Gen. Andrew Jackson, and British, under Sir Edward Pakenham. The latter, one of Wellington's Peninsular commanders, had just come from Europe with 20,000 men, all of whom had served under Wellington or Nelson. Cooperating with him was a fleet of 50 ships, carrying more than 1000 guns. After delaying for about a month, during which time he misled the Americans as to his purpose, Pakenham advanced upon New Orleans. This position was defended by Jackson, who, with a motley army of volunteers, backwoodsmen and regulars, had at the last moment thrown up a breastwork of earth, boxes and cotton bales. In less than half an hour after the 12,000 British had made the assault, under cover of a dense fog, they were twice driven back, their loss including 2500 men, among whom were Pakenham and many other officers. The Americans lost about 70. Unfortunately, this battle, the most severe of the war, occurred two weeks after the treaty had been signed at Ghent, December, 1814; but news of peace did not reach the United States until February.

New Philadelphia, *Fil" a del' fi a,* **Ohio,** a city and county seat of Tuscarawas Co., 24 m. s. of Massillon and 100 m. s. of Cleveland, on the Tuscarawas River, the Ohio Canal and the Pennsylvania and the Baltimore & Ohio railroads. It is situated in a farming region but its excellent water power and shipping facilities have contributed largely in making it a manufacturing city. New Philadelphia has mining interests of coal

and iron and manufactories of woolen goods, canned goods, roofing tile, flour, stamped, pressed and enameled goods, brooms, carriages, steel products and ironware. Schoenbrun Springs and Riverside Park are attractive places of interest. The town was settled in 1805 and incorporated in 1808. Population in 1920, U. S. Census, 10,718.

New'port, Ky., a city of Campbell Co., at the junction of the Ohio and Licking rivers, opposite Cincinnati, Ohio, and opposite Covington, Ky., on the Chesapeake & Ohio and the Louisville & Nashville railroads. The city is a popular residential suburb of Cincinnati and Covington. Electric railways connect with Bellevue, Dayton and Ft. Thomas, the last named being a United States military post, about three miles from the city. This post was established in 1888 to supersede the Newport Barracks, which were located in the city limits. Newport is attractively situated with wide and well-paved streets and numerous handsome residences. Industrially the city is important and ranks high among the manufacturing centers of the state. It contains large rolling and flour mills, brass and iron foundries and manufactories of cast-iron pipes, carriage supplies, watchcases, sheet iron, cigar-box material, steel rails and steel products. Among the most noteworthy buildings are the courthouse, city hall, fine banks and numerous handsome churches. Newport was settled in 1791 and incorporated as a town in 1795. A city charter was granted in 1834. Population in 1920, U. S. Census, 29,317.

Newport, R. I., a city, port of entry and county seat of Newport Co., 30 m. s. of Providence and 70 m. s.w. of Boston, on the southwestern portion of the Island of Rhode Island at the entrance to Narragansett Bay, and on the New York, New Haven & Hartford, the Newport & Wickford and other railroads. It has also regular steamer connection with Providence, Fall River and New York. The shelter of Newport Harbor has been known to mariners the world over for 150 years. The harbor is deep enough for the largest vessels and is defended by Ft. Greble and Ft. Adams, the latter a fortress of great strength. Ft. Walcott, which has a United States torpedo station and torpedo factory, is located on Goat Island. Coasters Harbor Island, farther north, has an important United States naval station and a war college.

Newport enjoys the distinction of being one of the best-known summer resorts in the country. Its balmy atmosphere, varied scenery and splendid facilities for bathing and boating have made it one of the most fashionable and favorite resorts for pleasure seekers in the land. The old part of the town has narrow streets and quaint buildings near the harbor which recall the early days of the colony. Many wealthy citizens of New York, Philadelphia, Boston and other large cities have erected cottages and palatial homes, which are almost unsurpassed in the luxury of their appointments. These magnificient mansions are located on Cliff Walk, which follows the brow of the cliffs for three miles along the famous 12-mile Ocean Drive. The parks add attractiveness to the thoroughfares. One of these, Touro Park, is embellished by bronze statues of William Ellery Channing and Matthew Perry. Another park, the Parade, forms a handsome approach to the old State House, in which is a statue of Oliver H. Perry, who won the Battle of Lake Erie. Largest of all the parks is Morton Park, the gift of Levi P. Morton, by whose name it is known.

Newport contains many fine public buildings. The Newport Hospital is one of the best-equipped institutions in New England. St. George's School for boys is located about a mile east of Easton's Beach. Newport is also the seat of the Townsend Industrial School. Among the historical points of interest are the Vernon House, used by Count Rochambeau as his headquarters during the Revolutionary War; the Touro Synagogue, the first church erected by the Hebrews of America; the Sayer House, used as headquarters by Prescott, the British

general; and the Redwood Library. The commerce and industries are not extensive. Newport has, however, a valuable coastwise trade in fish, coal and general merchandise.

Newport was settled in 1639. Most of the founders are commemorated by place names in the city and vicinity. During the Revolution the British held the town from December, 1776, to October, 1779, and in 1778 it was besieged by D'Estaing in command of a French fleet. It was chartered as a city in 1784 and rechartered in 1853. Until 1900, when Providence became the sole capital, Newport was one of the seats of government of the state. Population in 1920, 30,295.

Newport News, Va., a city and port of entry of Warwick Co., 12 m. n.w. of Norfolk and 75 m. s.e. of Richmond, on the James River at Hampton Roads. It is the terminus of the Chesapeake & Ohio Railroad, has electric railway connection with Norfolk, Portsmouth and Old Point Comfort and is connected by river steamboat service with Richmond and Petersburg. It is a harbor for coast steamship lines touching the large ports of the North Atlantic seaboard; and is a port for foreign steamships plying between it and London, Liverpool, Dublin, Glasgow, Belfast, Hamburg, Rotterdam and other foreign ports. The city is an important commercial center with a large export trade. It ranks as the fourth city in the United States in the shipment of grain. There is a famous shipbuilding yard here, in which the United States battleships *Illinois, Kearsarge, Kentucky, Louisiana, Minnesota, Missouri* and *Virginia* were constructed, as have been numerous submarines, gunboats, cruisers, merchant vessels and other craft. There are large grain elevators in the town, and ironworks, dry docks, woodworking mills, lumber mills and manufactories of shoes, medicines, shirts, knit goods and ice. Coal wharves and dry docks are important industrial features. The first settlement was made here in 1621. The present city was begun in 1882 and was incorporated in 1896. It was named in honor of Christopher Newport and Sir William Newce. Population in 1920, U. S. Census, 35,596.

Newport, Siege of. During the Revolution the British held the town from December, 1776, to October, 1779. They then destroyed some 480 houses and so crippled the shipping that the commercial position of Newport was never restored. Gen. John Sullivan, cooperating with D'Estaing and his French fleet, attempted to recover the place in the summer of 1778. While the fleet blockaded Narragansett Bay and bombarded the town, Sullivan, who held Providence, was to break down the land defenses with the help of Greene, Glover and Lafayette. Unfortunately the French had to put out to sea to meet Howe's fleet, which appeared at the crucial moment, but both fleets were disabled by a storm before a battle was ever begun. After being repaired in Boston, D'Estaing's vessel withdrew to the West Indies and operations about Newport ceased. Shortly following the evacuation of the British, Rochambeau arrived with a French army and remained in the town until almost the end of the war.

New Rochelle, *Ro shell',* **N. Y.,** a city of Westchester Co., 16 m. from the Grand Central Station, New York, on Long Island Sound and on the New York, New Haven & Hartford, the New York, Westchester & Boston and other railroads. The city is accessible by three steam and electric lines with seven conveniently located stations. New Rochelle has one of the finest harbors on the Sound on the picturesque Echo Bay. There are over 40 m. of well-lighted, paved and shaded streets. Trolley lines run to all near-by towns and cities and the various seaside resorts and beaches. The city is primarily a residential suburb of New York and contains many handsome residences and large estates. Hudson Park and City Park are spacious recreation parks. Travers Island, within the city limits, has the fine building of the New York Athletic Club. Among the prominent club buildings are the New Rochelle Yacht, on Harrison Island; the Rowing, the Wykagyl Golf,

the Huguenot Yacht and the tennis club buildings. Among the public buildings are the Masonic Temple, containing the public library; the Trust Company, the National City and other bank buildings and the Y. M. C. A. and Hebrew Association buildings. The churches of the city are adequate in number and imposing in architecture. The educational institutions include the College of New Rochelle, conducted by the Ursuline Order; St. Gabriel's School, under the auspices of St. Gabriel's Church; a high school, the Mayflower, Winyah, Trinity and Columbus schools and several parochial schools. The charitable and benevolent institutions include the Colburn Memorial Home for the aged and the New Rochelle Hospital.

The most important industry is the manufacture of druggists' scales. There is also a large printing and publishing plant. The first settlement was made in 1868, by Huguenot refugees from La Rochelle, France. New Rochelle was incorporated in 1847 and received a city charter in 1899. Population in 1920, U. S. Census, 36,213.

New Siberia Islands, a group of islands in the Arctic Ocean north of Siberia, Government of Yakutsk. The three largest islands are Kotelnoi, New Siberia and Fadievskoi. New Siberia is about 75 m. long and 30 m. wide. It contains interesting fossil remains of the mammoth, the buffalo and the rhinoceros. The group is 9650 sq. m. in area.

New South Wales, one of the original states of the Australian Commonwealth, located in the western part between Queensland upon the north and Victoria upon the south. It reaches the ocean westward to South Australia, a distance of from 600 to 750 m. Its area is 310,367 sq. m., about the same as that of the three Pacific States, Washington, Oregon and California. The Macintyre River forms a part of its northern boundary, and the Murray a part of its southern. The country is mainly mountainous, being crossed by the Australian Alps, which, with its many projecting spurs, crosses the country from north to south at a distance of from 25 to 120 m. from the coast. In general, they are abrupt in their slopes and broken by deep gorges and canyons. Descending to the east is a fertile, well-watered tract, but on the west is a region of plateaus visited by successive droughts and floods until desert conditions prevail. The principal rivers of New South Wales are tributaries of the Murray and the Darling.

New South Wales has the vegetation characteristic of the continent. There are forests of the tall eucalyptus, of oak, pine, ash, cedar and poplar, and regions of thorny shrubs. Where the soil is under cultivation wheat, maize, barley, oats, arrowroot, sugar cane, vegetables, cotton and fruits are raised. Considerable trade in native gums, fibers and bark is carried on. The great industry of the country, however, is stock raising; and sheep, cattle, horses and pigs are pastured upon the grasses of the valleys. Wool, meats, hides, leather, tallow and live stock are exported. The mines yield gold, silver, antimony, copper, iron, tin, coal and some diamonds. The manufacturing industries are chiefly concerned with shipbuilding and machine constructing.

New South Wales became a British colony in 1788, when it was settled as a penal colony. In 1843 a legislative council was established. There are now a Parliament of two houses, and a governor appointed by the Crown. Fully one-third of the population resides in and about Sydney, the principal port and capital city. The population is 1,648,210, 4000 of whom are natives. See AUSTRALIA.

Newspaper, a printed paper issued periodically for publishing the news.

HISTORY. The Romans and Chinese from an early period had issues similar to the modern newspaper. During the time of the empire the Roman generals were required to send daily accounts of what took place in the army, to those under their command. These tablets, called *Acta Diurna* (daily doings), were posted where all could see them. Gradu-

ally their scope was extended to include the acts of the Senate, opinions of public speakers and accounts of trials, punishments, deaths and public sacrifices. The *Peking Gazette,* containing imperial rescripts and official news, has appeared regularly since the eighth century A. D. Strictly speaking, however, the modern newspaper had its origin about the time that printing was introduced into western Europe. In the 16th century it was represented by news sheets consisting of single folio pages. In 1566 the Venetian Government established the official *Notizie Scritte,* containing accounts of events of general interest. At first they were not printed, but might be read in various public places, on the payment of a small coin called a *gazzetta,* from which is derived our name *Gazette.*

The first newspaper of the modern type was the *Frankfurter Journal,* issued in 1615, and the first English newspaper was the *Weekly Newes,* 1622. The first English daily newspaper was published in 1702, and in 1709 the penny paper originated. France brought out a newspaper in 1631 and Russia published one in 1703 under the authority of Peter the Great. Advertisements appeared as early as 1652. *Publick Occurences* was the first newspaper printed in the United States. It was issued in 1690 in Massachusetts, but was suppressed by the government. In 1704 the Boston *News-Letter* was begun, and is regarded as the first American newspaper. Among the earlier newspapers may be mentioned the Boston *Gazette,* issued in 1719, and the New York *Gazette,* issued in 1725. The *Advertiser,* issued in 1784, was the first daily printed in Philadelphia. There are now about 60,000 newspapers. Of these there are over 22,000 in the United States; 10,000 or thereabouts, are published weekly, and 4000 daily. Great Britain has 9500 papers; Germany, about 8000; and France, 6700.

MAKING THE MODERN NEWSPAPER. Originally the newspaper was printed on one side of the paper by means of a hand-screw press, and the sheets were small and the edition limited. At that time the proprietor was editor, compositor and printer, just as he is now in small towns where weekly journals are printed. In the cities the daily newspaper has its work systematized and its force well organized under the following departments: editorial, news, advertising and printing. The editor-in-chief determines the policy of the paper and decides to what items to give the most prominence, and under him are the different department editors, with their staff of correspondents and reporters. For strictly local matters there is a city editor, and for all foreign matters a special editor is in charge. News and local items are gathered and written up by the reporters, while the political and financial questions are looked after by editors specially chosen for this work. There is also a telegraph editor who takes care of all telegraphic matter (See ASSOCIATED PRESS). The matter of each department is supervised by the editor of that department, who selects what he deems desirable to publish. Afterwards the matter is sent to the composing room, where the copy is set up in type by linotype machines. From the composing room the set-up type is sent to the foundry room, and there the stereotyped, circular plates (See STEREOTYPE) are cast to fit the cylinder printing press (See PRINTING PRESS). These web-perfecting presses print both sides of the sheet at the same time, as it is fed from a roll of paper. It also cuts and folds the papers ready for distribution. The capacity of some of these presses reaches 150,000 12-page papers per hour.

The dailies usually appear in the morning; therefore most of the work on them is done at night, and this is so divided among the different departments that it is performed rapidly. Pen and ink drawings are made by the artists, from which half tones and zinc plates (See HALF TONE; ZINC ETCHING) are prepared for illustrating the article.

MANAGEMENT. A manager is employed to look after the financial part of the business, and under him are the heads of the advertising and circulation

departments. As the modern newspaper usually sells for a price below the cost of printing and paper, the income is derived chiefly from advertisements; and as the value of these depends largely upon the circulation of the paper, the man in charge of the circulation department is constantly working to increase the list of readers.

Newt, a small Amphibian of the Salamander Family found in streams and ponds of North America. The eggs are deposited upon the leaves of pond weeds and hatch in a month or month and a half into green, fishlike animals, which inhabit the water and live upon the animal and vegetable life which it affords. At the end of the season they become lung-breathing animals, lose their gills and make their homes under the half-decayed logs of the adjacent woodlands. Here they live for three or four seasons until they reach maturity, when they again take to the water to spend the remainder of their lives as gill-breathers. Many species of newts are found in the woods and waters of the United States.

New'ton, Sir Isaac (1642-1727), a famous English mathematician, philosopher and astronomer, born at Woolsthorpe, Lincolnshire. When 12 years of age he was sent to Grantham to attend school. From early youth he showed an inventive turn of mind, preferring to make kites, windmills and other mechanical toys rather than engage in the sports of his playmates. In 1661 he entered Trinity College, receiving his degree of bachelor of arts in 1665. In 1667 he became a fellow of the Trinity, and in 1668 received from that college his master's degree.

From 1669 to 1701 he filled the chair of mathematics at Cambridge. During the years at Cambridge he was pursuing the lines of investigation which have resulted in incalculable value to the world. In the field of optics he discovered the components of white light and explained the color of natural bodies; investigated the laws of the refraction of light; and invented the refracting telescope. He also estimated the length of light waves. During this time he was working on his *Principia,* which is the basis of modern mathematics and physics. He discovered the laws of gravitation and formulated them. He then applied them to the movements of the heavenly bodies and verified Kepler's Laws. He was also the discoverer of differential calculus, although this honor should perhaps be shared with Leibnitz.

In 1689 Newton was made member of Parliament as representative of the University of Cambridge, and maintained the rights of that institution in a critical period of its history. In 1672 he became a member of the Royal Society, and in 1703 was elected president, a position of great honor, to which he was regularly reelected for a period of 24 years, holding the office to the end of his life.

In 1696 Newton was made warden of the mint, a position which did not impose more service than he could render in connection with his professorship in Cambridge. His scientific knowledge was of very great value in the recoinage, and he gave to it his best efforts. In 1699 he was promoted to the position of master of the mint, which he held until his death. This position was more remunerative and justified him, financially, in resigning his professorship, which he did in 1701. In 1705 he received the distinction of knighthood. See ASTRONOMY; GRAVITATION; TELESCOPE; SOLAR SYSTEM.

Newton, Kan., a city and the county seat of Harvey Co., 201 m. s.w. of Kansas City, on the Missouri Pacific, the Atchison, Topeka & Santa Fe and other railroads. Situated in the valley of the Arkansas River, one of the most fertile sections of the state, the town derives its revenue chiefly from agricultural activities. It has a considerable trade and large stock-raising interests. Manufacturing is promoted by natural gas, the principal plants being flour mills, a thrashing-machine factory, drill works, a separator factory and an ice factory. There are also a creamery and stockyards. At Newton there is a large set-

element of German-Russian Mennonites, who immigrated in 1873, and who maintain here a hospital and Bethel College, the only college in America controlled by the Mennonite sect. There is a Carnegie library in the town. Newton, first settled in 1871, was chartered as a city in 1872. Population in 1920, 9,781.

Newton, Mass., a city of Middlesex Co., 6 m. w. of Boston, on the Charles River and on the Boston & Albany Railroad. The city occupies an area of about 18 sq. m., and included within the municipal limits are the villages of Newton Center, Newton Upper Falls, Newton Lower Falls, Newtonville, Auburndale, West Newton, Newton Corners and Newton Highlands. Newton has a site of great beauty and is one of Boston's attractive suburbs. Though primarily a residential city, Newton has extensive manufactures, which include paper boxes, curtains, boots and shoes, cordage, railway signals, hosiery, motor vehicles, starch, dry plates, pianos, cottons, chemicals and worsteds. The Charles River furnishes abundant water power for the promotion of the manufacturing interests. The Lasell Seminary for women, the Allen School for boys and the Newton Theological Institution (Baptist) are located here. The town was settled in 1631 and was a part of Cambridge until 1688, when it was incorporated under the name of New Cambridge. Near the site of Waban's Wigwam, where John Eliot began to preach to the Indians on Oct. 28, 1646, stands the Eliot Memorial. A large cemetery in the heart of the city contains the graves of many people noted in history. Newton is one of the wealthiest cities per capita in the United States. It was chartered as a city in 1873. Population in 1920, 46,054.

New West'minster, the former capital of British Columbia, situated on the north bank of the Fraser River and on the Canadian Pacific Railway, 75 m. from Victoria. Among the prominent buildings are the Columbian College, the Roman Catholic convent and college, the Provincial Asylum for the Insane and the Dominion Penitentiary. The export lumber and fish trade is extensive, and among other industrial establishments are a paper mill, glass works, steel-pipe works, soda-water works, a brewery and a distillery. Population in 1911, 13,199.

New Year's Day, the first day of January, beginning a new year. In different periods of history and among the different nations, various times of the year have been reckoned as the beginning of the year, but at whatever time the year began, the first day has been observed as a festival or holiday from the most ancient times. Watching the old year out and the new year in, ringing of bells at midnight to mark the passing, and New Year's calls and greetings are popular customs. See CALENDAR.

New York, THE EMPIRE STATE, one of the Middle Atlantic States, is bounded on the n. by the provinces of Ontario and Quebec, on the e. by Vermont, Massachusetts, Connecticut and the Atlantic Ocean, on the s. by New Jersey and Pennsylvania and on the w. by Pennsylvania, Lake Erie and the Province of Ontario. Nearly one-half of the boundary line is water. In lakes Champlain and Ontario the line follows the deepest channel, giving New York a little less than one-half of each of these bodies of water.

SIZE. The greatest length from east to west is 326 m., or 412 m. including Long Island. The width from north to south is 312 m. The area is 49,204 sq. m., of which 1550 sq. m. are water. New York is a little smaller than Maine, Vermont and New Hampshire combined, a little smaller than England, a little larger than Louisiana and the 29th state in size.

POPULATION. In 1920 the population was 10,385,227. Between 1910 and 1920 there was a gain in population of 1,271,613, or 14 per cent. There were 217.9 inhabitants to the square mile. The state ranks first in population. Of the total number of inhabitants more than one-half are found in New York City.

SURFACE. The northeastern part of the state is occupied by the Adirondack Mountains, which constitute its most

prominent physical feature. These mountains extend southward to the Valley of the Mohawk and westward to the slope which descends from Lake Champlain. Their sides are covered with forests and in their valleys are many beautiful lakes. The highest peak, Mt. Marcy, 5345 ft., is the highest point in the state. There are a number of other peaks ranging from 2000 to 4000 ft. in altitude (See ADIRONDACK MOUNTAINS).

South of the Adirondacks is the Mohawk Valley, which extends from the southeastern boundary of Lake Ontario to the Hudson River near Albany. This is a low, narrow valley with nearly a level slope. South of the Mohawk Valley are the Catskill Mountains. These form a group rather than a range, and have elevations ranging from 2000 to 4000 ft., Slide Mountain, the highest peak, having an altitude of 4205 ft. Their slopes are wooded, but they do not contain such extensive forests as the Adirondacks. In the southeastern part of the state is a mountain range extending northward to about the head of Lake Champlain. This is a continuation of the Taconic and Hoosac mountains in Massachusetts. To the west of these mountains lies the narrow Valley of the Hudson River, which in the lower part of its course cuts its way through one of these ranges, forming the beautiful Highland Region.

West of the Catskills and occupying all of the southern and central parts of the state and extending to its western boundary is the great plateau region, having an elevation varying from 1000 ft. in the east to 2000 ft. in the west. Numerous rivers have cut deep valleys in this plateau and there are also a number of depressions formed by glacial action, many of which are occupied by lakes. North of the plateau the land descends by two terraces and gentle slopes to Lake Ontario. The terrace farthest inland from the lake is formed by a crest of limestone that forms the escarpment over which Niagara Falls plunges, and on which the Erie Canal passes at Lockport.

RIVERS AND LAKES. The northern slope of the state is drained into Lake Ontario and the St. Lawrence River. The Raquette, Oswego, Black and Genesee are the most important streams flowing into Lake Ontario. The eastern part of the state is drained by the Hudson, which is the most important stream within its boundaries, and distinctively a New York river. Its chief tributary is the Mohawk. The southern part is drained into Delaware and Chesapeake bays by the Delaware and Susquehanna rivers and their tributaries, and a smaller portion of the western part is drained into the Allegheny, thence into the Ohio and the Mississippi.

New York has a large number of lakes. Many of these are found in the glens and valleys in the Adirondacks and Catskill ranges, and contribute much to the beauty of these mountains. In the central part of the state are a number of long, narrow bodies of water, designated because of their form, the "Finger Lakes." The largest are Seneca and Cayuga, each about 40 m. long and from 1 to 4 m. wide. Oneida Lake, northeast of these, is 20 m. long and about one-fourth as wide. Chautauqua Lake in the western part of the state is noted as a summer resort and educational center. Lake George, south of Lake Champlain, is surrounded by mountains and is one of the most beautiful mountain lakes in the world.

SCENERY. The Adirondack and Catskill regions are especially attractive to summer visitors and contain many cottages and villas which are the summer homes of people from all parts of the country. In the heart of the Adirondacks the state has set apart a large area as a forest preserve, in which forests and game will be protected. Thousand Islands Park in the St. Lawrence River is also widely known as a summer resort. The Valley of the Hudson is known far and wide for its beauty, and on the western boundary the Niagara Falls and River are objects of world-wide interest. Within the state also are many gorges, cascades and cataracts of more than local

reputation, some of which are now included in a state park. Among these are the Genesee Falls near Rochester, Kaaterskill Falls in Greene County, Cohoes Falls in the Mohawk, Glens Falls near the city of the same name and Ausable Falls in Wilmington.

CLIMATE. Owing to the influence of the ocean, Long Island and Staten Island have an equable climate, though some days in summer are intensely hot. In the northern part of the state among the Adirondacks the winters are long and severe and deep snows are common, but the summers are cool and delightful. The central and western parts have milder winters and warm summers. The annual rainfall varies from about 50 inches in the east to 40 inches in the west, being 35 inches in most of the state.

MINERALS AND MINING. In the Adirondack region are valuable deposits of iron ore, which were formerly more extensively worked than now, owing to the development of the mines in the Lake Superior region. The output from these mines, however, is still important. Salt is found in large quantities in the central part of the state, and there are extensive beds of clay along the Hudson in the lower part of its course. New York is the leading state in the production of gypsum. Talc, limestone, red and brown sandstone, marble, and rock for making cement are quarried in paying quantities. Petroleum and natural gas are found in the western part of the state. The manufacture of brick is one of the leading mineral industries. The mineral springs at Saratoga and other points make New York the second state in importance in the production of mineral water.

FORESTS AND LUMBER. The most extensive forests are in the region of the Adirondacks. They contain white pine, spruce and hard woods. There are smaller forest areas among the Catskills. Lumbering is now practically restricted to cutting spruce for the manufacture of wood pulp and to the production of lumber and timber for local needs. Much lumber is found on farm wood lots, where it is very valuable for farm buildings, most of which are constructed of the lumber on the farms.

AGRICULTURE. With the exception of some of the rock regions among the mountains and a few sandy hills the soil of two-thirds of the state is suitable for agriculture, and most of the fertile land is under cultivation or used as pasturage. The average size of the farms is smaller than that of those of the Central West and larger than that of those in some of the New England States. Diversified farming is generally practiced.

Soil. In the river valleys the soil is composed largely of alluvium, but that in the uplands is formed from decomposed limestone, shale and other native rock, and is adapted to growing general farm crops, fruits and vegetables. In most localities fertilizers are used to considerable extent, and good yields are generally secured, except in the southern plateau region, where the valleys are very productive but the hills give poor returns to the farmer.

Products. The leading field crops are hay, potatoes, oats, corn, wheat, beans, buckwheat, rye, tobacco and barley. In the central and western parts of the state apples, peaches and grapes are raised in large quantities. In all localities near cities garden vegetables are grown. The farms on Long Island and along the Hudson north of New York City are generally devoted to market gardening.

New York is one of the leading dairy states, and the income from dairy products forms nearly one-third of the entire agricultural income of the state. Hops and tobacco are raised in the central part of the state. The growing of flowers for the market is an important industry near the large cities. Some farmers derive a good income from pure-bred dairy cattle. The revenue from poultry is constantly increasing. In the northern and southern parts of the state maple sugar is produced in large quantities; New York ranks next to Vermont in the production of this delicacy. New York as a whole is one of the leading agricultural states in the country.

NEW YORK

THE EMPIRE STATE

1. Niagara Falls
2. Erie Canal
3. Salt
4. Quarrying
5. Hay
6. Dairying
7. Gardening
8. Machinery
9. Clothing
10. N. Y. City Skyline
11. Commerce
12. Statue of Liberty

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NEW YORK

MANUFACTURES. Manufacturing is the chief industry and New York leads the Union in the extent and variety of its manufactured products. Abundant water power, excellent transportation facilities and convenient location of manufacturing centers with reference to sources of raw material and markets have been the important factors in developing the great manufacturing industries of the state. The cities of New York and Buffalo are the chief manufacturing centers, but factories of various sorts are widely distributed over the state.

The lumber industry leads in the forest region of the Adirondacks. Along the Hudson are the largest brickyards in the world, the annual value of their output exceeding $12,000,000. The manufacture of clothing ranks first among the factory products, the chief centers of this industry being New York City and Rochester. Next in order of value are cotton and woolen goods, silks and other textiles. The manufacture of typewriters and other small machines is also important. The manufacture of agricultural implements, heavy machinery and foundry products also gives employment to a large number of workmen. Syracuse is noted for its soda-ash works, the largest in the world, and Troy for the manufacture of its collars and cuffs. The great power plants at Niagara have caused numerous factories to be located there, and power from the falls is sent by current to many other cities. Among the most important of these plants are those for the production of aluminum and the manufacture of carborundum. See NIAGARA FALLS, N. Y.

Rochester is the leading center for the manufacture of cameras and other optical instruments. The canning of fruits and vegetables, the production of condensed milk and the production and canning of foods are also widely extended industries. New York is first in the manufacture of clothing, optical instruments, typewriters, shirts and collars, and ranks with Michigan in the production of salt. It is second only to Pennsylvania in the output of brick and tile.

TRANSPORTATION AND COMMERCE. The trunk lines of the New York Central and West Shore railroads extend across the state from Buffalo to Albany, thence down the Hudson Valley to New York City. The New York Central system controls most of the railroads in the state and has numerous branches so extending from its main line as to reach nearly all commercial and industrial points. The Erie, the Lehigh Valley, the New York, Ontario & Western and the Delaware & Hudson railroads also extend through the state and supplement the lines of the New York Central system. Most parts of the state have ample railroad facilities. Numerous electric lines connect villages and small towns with near-by cities.

The great water route connecting Lake Erie and the Atlantic by means of the Erie Canal and Hudson River is one of the most important factors in developing the industries of the state (See ERIE CANAL). Steamers ascend the Hudson as far as Albany and Troy and an extensive traffic is carried on this route. A canal connects the Hudson with Lake Champlain, which is also connected by a canal with the St. Lawrence River. New York City is the chief seaport and commercial center of America and is connected by regular lines of steamers with the leading ports of the world. Several trans-Atlantic cables also have their western terminus in this city.

New York is a leading commercial state. Over 35 per cent of the exports and 64 per cent of the imports of the United States pass through the port of New York. This city is also the terminus of numerous trunk lines of railroad, which with their connections extend to the Central West and the Pacific coast, so that the inland trade of the city exceeds that of foreign countries. The manufactured goods of the state are distributed throughout the country and large quantities of raw material are imported from other states. In addition to this the handling of the food supplies necessary to meet the needs of the large cities of the state is in itself an enormous

business. New York and Buffalo are the chief commercial centers.

GOVERNMENT. The present constitution was revised in 1894. According to its provisions a convention for revising the constitution must be called at least once in 20 years. All male citizens 21 years and over can vote, unless they are imbeciles or criminals. The governor, lieutenant-governor, secretary of state, comptroller, treasurer, attorney-general and state engineer and surveyor are elected biennially by popular vote. The governor appoints a superintendent of public works, a superintendent of banking, of insurance and of state prisons, a factory inspector, a commissioner of agriculture, a commissioner of labor statistics and an excise commissioner. He has the power of veto, but a bill can be passed over his veto by a two-thirds vote of the Senate and Assembly. The commissions of health, lunacy and charities, and of railroads, forests, quarantine and tax equalization constitute the most important state boards.

The Legislature consists of a Senate of 50 members and an Assembly of 150 members. Senators are elected for two years and assemblymen for one.

The judicial department comprises a Court of Appeals consisting of a chief justice and six associate justices, and a Supreme Court of 76 justices, all chosen by popular vote for 14 years. The state is divided into eight judicial districts in which these judges hold court. Lower courts consisting of County Courts, City Courts, Surrogate and justice courts are established when needed.

EDUCATION. The public schools of New York are noted for the completeness of their equipment, thoroughness of instruction and general efficiency. The schools are under control of the State Board of Regents, consisting of 12 members elected by the Legislature and known as the University of the State of New York. The executive officer of this board is the commissioner of education. He has general supervision of the schools of the state, and also of the state library and museum.

The state maintains a normal college at Albany for the training of high school teachers, and 15 normal schools for the training of teachers in the elementary schools. The state agricultural college and experiment station is connected with Cornell University at Ithaca. There is a state experiment station at Geneva, and schools of agriculture are located at Canton, Alfred and Morrisville. Higher institutions of learning not under control of the state are: Cornell University at Ithaca; Columbia University, New York University and the College of the City of New York at New York; Syracuse University at Syracuse; Vassar College at Poughkeepsie; Colgate University at Hamilton; St. Lawrence University at Canton; Hobart College at Geneva; Union University at Schenectady; the University of Rochester at Rochester; Rensselaer Polytechnic Institute at Troy; St. John's and St. Francis Xavier at New York City. In addition to these there are numerous medical and technical schools and theological seminaries throughout the state. The United States Military Academy is at West Point.

STATE INSTITUTIONS. The asylums for the feeble-minded are at Syracuse and Newark. The school for the blind is at Batavia and the school for crippled and deformed children is at Tarrytown. The state maintains 14 hospitals for the insane. State prisons are located at Sing Sing (Ossining), Auburn and Clinton and there are reformatories at Elmira, Napanoch and Bedford. That at Bedford is for women. There are also several reform schools and industrial schools for juvenile offenders. In all, the state maintains over 500 charitable and penal institutions.

CITIES. The chief cities are Albany, the capital; New York, Buffalo, Rochester, Syracuse, Troy, Utica, Yonkers, Binghamton, Elmira, Schenectady, Auburn, Newburgh, Kingston, Poughkeepsie and Cohoes.

HISTORY. New York, named for the Duke of York, later James II, was visited in 1609 by Champlain, who came by way of Canada and Lake Champlain,

and by Henry Hudson, in the Dutch East India Company service, who entered the harbor and ascended the Hudson River. Having made peaceful arrangements with the Iroquois, the Dutch were profitably dealing in furs with them as early as 1612. In 1614 Ft. Nassau was established within the present limits of Albany. Albany was settled in 1624; New Amsterdam (New York), two years later. After years of friction with the Puritans on the east, the Swedes on the south and with the Indians, and after, too, the conciliating rule of Peter Stuyvesant, the Dutch lost New York in 1664, when Charles II granted the Duke of York all the land "from the west side of the Connecticut River to the east side of Delaware Bay." Sir Edmond Andros then governed the colony nine years.

The state was the scene of much violence during the last French and Indian War (1754-60). New York was active in the pre-Revolutionary struggle. In 1775 it established an independent government; in 1776, adopted a constitution; in 1778, ratified the Articles of Confederation, though opposing strong central government, and in July, of the same year, as the 11th state, agreed to the Constitution. For years after 1800, the Anti-Federalists, chiefly under De Witt Clinton, were a power in the state. The completion of the Erie Canal, 1825, caused the marvelous growth of such cities as Buffalo, Rochester and New York. In 1831 New York did away with imprisonment for debt. Though bound to the South, commercially and socially, New York furnished 490,000 men and about $90,000,000 for the Union army during the Civil War. Since the war the state has enjoyed phenomenal prosperity. Consult Roberts' *New York,* in the American Commonwealths Series.

GOVERNORS. George Clinton, 1777-1795; John Jay, 1795-1801; George Clinton, 1801-1804; Morgan Lewis, 1804-1807; Daniel D. Tompkins, 1807-1817; John Taylor, 1817; De Witt Clinton, 1817-1823; Joseph Christopher Yates, 1823-1825; De Witt Clinton, 1825-1828; Nathaniel Pitcher, 1828-1829; Martin Van Buren, 1829; Enos Thompson Throop, 1829-1833; William Learned Marcy, 1833-1839; William Henry Seward, 1839-1843; William C. Bouck, 1843-1845; Silas Wright, 1845-1847; John Young, 1847-1849; Hamilton Fish, 1849-1851; Washington Hunt, 1851-1853; Horatio Seymour, 1853-1855; Myron Holley Clark, 1855-1857; John Alsop King, 1857-1859; Edwin Dennison Morgan, 1859-1863; Horatio Seymour, 1863-1865; Reuben Eaton Fenton, 1865-1869; John Thompson Hoffman, 1869-1873; John Adams Dix, 1873-1875; Samuel Jones Tilden, 1875-1877; Lucius Robinson, 1877-1880; Alonzo Barton Cornell, 1880-1883; Grover Cleveland, 1883-1885; David Bennett Hill, 1885-1892; Roswell Pettibone Flower, 1892-1895; Levi Parsons Morton, 1895-1897; Frank Swett Black, 1897-1899; Theodore Roosevelt, 1899-1901; Benjamin Barker Odell, 1901-1905; Frank Wayland Higgins, 1905-1907; Charles Evans Hughes, 1907-1910; Horace White, 1910; John A. Dix, 1911-1913; William Sulzer, 1913; Martin H. Glynn, 1913-1915; Charles S. Whitman, 1915-19; A.E.Smith, 1919-21; N. L. Miller, 1921—.

New York, City of, N. Y., largest city in the state, commercial metropolis of the United States and second city in size in the world, advantageously situated on the Hudson, or North, River, where it flows into the New York Harbor and the Atlantic Ocean; the strait, or East River, flows through the city, connecting with Long Island Sound. The city is 226 m. n.e. of Washington, 232 m. s.w. of Boston and 911 m. e. of Chicago, and is the terminal of the main lines of the New York Central & Hudson River, the Pennsylvania, the Baltimore & Ohio, the Lehigh Valley, the Central of New Jersey, the Erie, the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the West Shore, the New York, Ontario & Western, the Long Island, the New York, Lake Erie & Western and other railroad systems. New York is today the leading seaport of the world, and 157 steamship and steamboat lines run not only to points on

the coast, Sound and river, but to various ports of the world. What is now known as the "port of New York" has a total water front of 444 m.

General Description. Although very irregular in shape, the city is in extreme dimensions about 35 m. long and about 17 m. wide and has the largest area of any city in the United States, covering 327 sq. m. The land area comprises 209,218 acres. Previous to 1874 the city did not extend beyond Manhattan Island. Parts of the southern portion of Westchester County were annexed during that year and other parts of Westchester in 1895. In 1898 the city's boundaries were enlarged, and what is now known as Greater New York is composed of five boroughs: the borough of Manhattan, on Manhattan Island, including a number of small islands; the borough of Richmond (Staten Island); the borough of Brooklyn; the borough of Queens; and the borough of The Bronx, which is the extreme southeastern portion of the mainland of New York State.

The harbor of New York is one of the largest and best in the world, and one of the few which can be cheaply adapted to the increasing size of ocean steamers and the enormous growth of international commerce. The harbor, which is strikingly beautiful, is practically divided into three parts, the lower bay, the upper bay and the North and East rivers. The North River is the great commercial feeder by which the traffic of the Hudson River and the Erie Canal is brought to this port. The coastwise trade with New England reaches New York through Long Island Sound and the East River. The Harlem River, separating Manhattan from The Bronx, is a place of anchorage for small craft. The piers of the trans-Atlantic steamship companies are on the North River, part of them being at Hoboken on the New Jersey side. The East River has the docks of factories, sugar refineries, warehouses and government storage houses; great basins for canal boats; and the Erie and Atlantic basins. See East River; Hudson River; Erie Canal.

Bridges, Ferries and Subways. There are 45 bridges in the city of New York, of which four—New York and Brooklyn, Queensboro, Williamsburg and Manhattan—rank among the great bridges of the world, having lengths of from 2793 ft. to 7449 ft. and main spans of from 1470 to 3724 ft. The Harlem River is crossed by about 12 bridges, including High Bridge, which carries the city's aqueduct. There are also ferry lines operating to all points on both sides of the city, but the Pennsylvania and the Hudson River tunnels have in a great degree taken the place of the ferryboats for passenger traffic between Manhattan and railroad terminals in New Jersey. A subway reaching from Van Cortlandt Park, or 242d Street, in The Bronx, through New York to Brooklyn and Queens, has been constructed at enormous expense. A dual system of subways has also been provided for at a cost of $325,000,000, the contract being signed on March 19, 1913. The only means of transportation, however, to North Brother, Randalls, Wards, Bedloes, Ellis and other islands owned by the municipality, is by ferryboats. The ferry line to Staten Island is owned and operated by the city. There are elevated lines on Second, Third, Sixth and Ninth avenues which converge at the Battery, and a network of surface cars traverse the city in all directions. Submarine cables and wireless-telegraph stations place New York in direct communication with all the cities of the world. The famous Bartholdi statue of *Liberty Enlightening the World* is located on Bedloes, or Liberty, Island, two miles southwest of the Battery.

Parks, Streets and Boulevards. New York has a park system of 7500 acres valued at over $5,000,000. The system includes 175 parks, 35 parkways and four plazas. The principal parks are Central Park in Manhattan, of 840 acres, Bronx, Van Cortlandt and Pelham Bay parks in the borough of The Bronx, and Prospect Park in Brooklyn. Central Park is situated between 59th and 110th streets and between Fifth and Eighth

A CANYON WALLED BY LOFTY BUILDINGS

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LOWER BROADWAY, NEW YORK

On the left rises the steeple of Trinity Church, an historic landmark. The Woolworth Building looms dimly in the distance.

THE GIANT OF THE SKYSCRAPERS

Height—
780 feet

Number of
Stories—55

Total Weight-
206,000,000
pounds

Floor Area—
40 Acres

Number
of Electric
Lights—
80,000

Miles of
Plumbing—43

Number of
Elevators—28

Combined
Height of
Elevator
Shafts—
2 Miles

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WOOLWORTH BUILDING, NEW YORK

This great building towers 225 feet higher than Washington Monument.

avenues, Manhattan. Bordering on the city line of Yonkers is Van Cortlandt Park, in which is the Van Cortlandt Mansion, built in 1748 and occupied by Washington and Rochambeau in 1781, and which is now a Revolutionary museum. Bronx Park reaches from 180th Street to 205th Street, the northern part being occupied by the New York Botanical Gardens and the southern part by the Zoological Park. Battery Park occupies the extreme southern end of the city next the sea wall and contains the famous New York Aquarium and a children's playground. Among the better known of the city's smaller parks and squares are Union, Washington, Madison, Bryant and Tompkins squares and City Hall, Riverside, Morningside, Mt. Morris, Audubon and De Witt Clinton parks. Recreation piers projecting into the Hudson and East rivers are interesting features of New York's summer life.

The streets of New York have a mileage of about 4000. The city originally began at the lower end of Manhattan Island and has spread mainly north and east. The business center of the city above 14th Street is laid out in rectangular avenues and squares. Broadway is the most important of the avenues and is unfortunately narrow in the extreme down-town part of its length. At Tenth Street it bears off to the northwest, and from 60th Street to 162d Street it is called the Boulevard; from this point to the Yonkers city line it is known as the famous Kingsbridge Road or "Speedway." The principal shopping districts are on Broadway from Eighth Street to 34th Street and on Sixth Avenue from 14th to 34th streets, but a shopping district has arisen on 125th Street. Fifth Avenue, second in fame to Broadway, extends from Washington Square to the Harlem River. Fifth Avenue ranks as the foremost street of wealth and fashion in the United States. Between 50th and 90th streets, Fifth Avenue has many magnificent residences, and Madison Avenue vies with it in the elegance of its private dwellings. West End Avenue, Central Park West, and Riverside Drive are splendid residence streets. The wholesale dry-goods district is on lower Broadway and the streets between Prince and Reade streets. The wholesale-grocery section lies immediately west of this. Maiden Lane and vicinity has the wholesale-jewelry trade. Wall and Broad streets, where center the financial interests of the city and nation, are east of Broadway in the down-town part of the city. A little farther up town on the East Side is the tenement district, one of the most crowded in the world. This district contains a large portion of the foreign population.

Public Buildings. Among the many notable public buildings of the city are the custom-house, built in 1902-07; the United States Subtreasury, on Wall Street, on the site of Federal Hall, in which George Washington was inaugurated first president of the United States; the post office; the city hall, one of the handsomest of New York's earlier buildings; the courthouse; the Hall of Records, in the style of the French Renaissance; the Chamber of Commerce; the United States Realty; the Produce Exchange; the New York Clearing House; the Cotton Exchange; the Stock Exchange; and the new Municipal Building of 40 stories, which cost about $19,000,000. The main part of this building is 24 stories high and is pierced by an arcade through which runs Chambers Street. The tower itself includes the space from the 25th to the 40th stories. Other "skyscrapers," aside from the Municipal Building, which break the city's sky line, are the Singer Building, 41 stories high; the Woolworth, the highest office building in the world, being 30 stories high and having a tower of 25 additional stories; the City Investing Building of 32 stories; the Park Row Building of 30 stories; the Trust Company of America of 23 stories; the Hudson Terminal buildings of 22 stories and four stories underground, including the terminal of the down-town Hudson River tunnels; the "Flatiron," or Fuller, 290 ft. high; the Home Life Insurance; the Equitable

Life Assurance; the Times, 363 ft. high; the Metropolitan Life Insurance, 700 ft. high; the Manhattan Life, the Drexel, the Empire, the Commercial Cable, the Trinity, the Union Trust and the Pulitzer buildings. Wall Street runs from Trinity Church east to the river and is lined with buildings from 12 to 20 stories high, used by banks and financial institutions. The post-office building at City Hall Park was erected in 1875. The Criminal Courts Building, a fine structure on Centre Street, is connected with the Tombs, the city prison, by a covered bridge called "The Bridge of Sighs." There are several large armories in the city, the best known being those of the 7th, 69th and 71st regiments. The Grand Central Station at 42d Street, near Fourth Avenue, has been completely remodeled and enlarged on a magnificent scale. This and the new Pennsylvania Railroad Passenger Station, built of granite and located between 31st and 33d streets and Seventh and Eighth avenues, exceed in magnitude and elegance of equipment any other structures of their kind in the world. The Pennsylvania station has direct connection with the tunnels from New Jersey and Long Island.

Educational Institutions. The oldest and largest institution of higher education in New York City is Columbia University at 116th Street and Broadway. This university, formerly called King's College, was founded in 1754. Farther north, in the borough of The Bronx, are the handsome buildings of New York University. This institution was chartered in 1831 as the University of the City of New York. It received its present name in 1896. Fordham University (Catholic), now included in New York City, was founded in 1841 as St. John's College. Other Catholic institutions include the College of St. Francis Xavier, St. John's College and Manhattan College. Barnard College for women and Teachers' College (coeducational), with which is incorporated the Horace Mann School, are affiliated with Columbia University. Other institutions of learning include the General Theological Seminary of the Protestant Episcopal Church, the Union Theological Seminary (Presbyterian), the Jewish Theological Seminary of America, the College of Physicians and Surgeons, the New York Post-Graduate Medical School, the Polyclinic Medical School, the New York Law, one of five law schools, a normal college for girls and a city college for boys. Cornell University maintains part of its medical department in New York. Cooper Union and the People's Institute occupy prominent places among the educational institutions of the city. There are also a school of commerce, finance and accounts, many private secondary schools, three art schools, five schools of music and about 38 private academies. Greater New York contains many parochial schools and more than 550 public school buildings, including 21 high schools, trade and vocational schools. The city has a budget allowance for annual salaries of the supervising and teaching staff, of over $29,000,000. The board of education of the city has controlled since 1874 a nautical school, a training ship being loaned for the purpose by the United States Navy Department. A teacher's retirement fund was established in 1894.

Churches. Exclusive of Brooklyn, which is known as the "City of Churches," New York contains about 900 churches. The city became the see of a Catholic bishop in 1808 and of an archbishop in 1850. One of the most notable churches is Trinity Church in Broadway at the head of Wall Street. This church has the longest continuous history of any parish in New York. In its churchyard are the graves of Robert Fulton, Alexander Hamilton, Albert Gallatin, Capt. James Lawrence and others prominently identified with the earlier life of the city. Among other noted churches is St. Patrick's Cathedral (Catholic), at 50th Street and Fifth Avenue, which is one of the most elaborately decorated churches in the country. The Cathedral of St. John the Divine, near Morningside Park, at 112th

Street, was begun in 1892 and when completed willl have cost from $7,000,000 to $10,000,000. St. Saviour's Chapel and the crypt were completed in 1910. St. Mark's, St. Paul's, Christ, Grace and Church of the Ascension are other prominent Episcopal churches. The first Methodist society in the United States was formed in New York in 1766 and still exists as the John Street Church. The Metropolitan Temple is one of the best known of the Methodist churches. Historically the oldest religious denomination in the city is the Dutch Reformed. The Presbyterian denomination is relatively strong in the city. The First Baptist Church, organized in 1762, is the oldest church of this faith, and the Fifth Avenue Church is the wealthiest church of the Baptist denomination in the city. Included in the number of churches are about 119 Jewish temples and synagogues, 70 Lutheran and about 90 miscellaneous churches and chapels.

Charities and Hospitals. In the United Charities Building on East 22d Street are housed the Children's Aid Society, the New York City Mission and Tract Society and the Charity Organization Society. The United Hebrews Charities was formed by the union of four Hebrew societies in 1874. The Society of St. Vincent de Paul is the Catholic organization. The Russell Sage Foundation has headquarters in the city. Among the most noteworthy domestic and trade schools are: Grace Institute, endowed by W. R. Grace, twice mayor of the city; Baron de Hirsch Trade Schools, with day and evening schools; Clara de Hirsch Home for working girls and Association of Practical Home Making. There are also schools for the blind, oral schools for the deaf, many orphanages and day nurseries and about 30 homes for adults in the boroughs of The Bronx and Manhattan. Among the special hospitals are the Manhattan Eye and Ear Hospital, New York Bacteriological Institute, Neurological Institute, New York Eye and Ear Infirmary and Institute for Medical Research. The general hospitals include the Post-Graduate, the Roosevelt, the Hahnemann, the New York, the St. Luke's, the Mt. Sinai, the Presbyterian, the Wright and the Flower hospitals. The institutions which care for the sick and disorderly are located on Randalls, Wards and Blackwells islands in the East River.

Libraries and Museums. The New York Public Library is the chief library of the city. This library was established in 1895 by consolidation of the Astor and Lenox libraries and the Tilden Trust. In 1902-11 a magnificent new library building was erected in Bryant Park, and the library now contains over 2,000,000 volumes and pamphlets. In 1901 Andrew Carnegie gave $5,000,000 for the establishment of about 65 branch libraries, the city furnishing the sites and also assuming the cost of maintenance. Columbia University has the largest and best equipped of the college libraries. The Mercantile and the New York Society Library are subscription libraries. The Slade (architectural) and the De Milt (reference) libraries are used in connection with the General Society of the Mechanics and Tradesmen Circulating Library. Cooper Union Library has a complete set of newspaper files and patent-office reports.

The most notable of the museums are the American Museum of Natural History, the Metropolitan Museum of Art near Fifth Avenue on 83d Street, the Botanical Gardens in Bronx Park and the New York Aquarium at Battery Park, which contains excellent exhibits of marine life. Among the learned societies of the city are the New York Historical, the American Society of Civil Engineers, the American Geographical and the American Numismatic societies.

Monuments and Statuary. The greatest monument in the city is the mausoleum of Gen. Ulysses S. Grant in Riverside Park, at 122d Street. This tomb was designed by John H. Duncan in 1897. The Soldiers' and Sailors' Monument is in the same park, at 90th Street. This beautiful monument was designed by C. W. Stoughton, A. A.

Stoughton and P. E. Duboy. At the foot of Fifth Avenue is the granite Washington Arch, designed by Stanford White. Among the noted statues are *W. T. Sherman,* by Saint Gaudens; *Nathan Hale,* by MacMonnies, in the City Hall Park; *Shakespeare, Indian Hunter, Pilgrim, George Washington* and *Greeley* by J. Q. A. Ward. There are many other noted statues in the parks and about the city. The Egyptian obelisk, popularly called "Cleopatra's Needle," in Central Park, was presented to the city by the Khedive of Egypt in 1877. This obelisk was brought to New York at the expense of W. H. Vanderbilt in 1880, and erected a year later.

Hotels, Clubs and Theaters. New York is a city of hotels, and its accommodations for strangers are unexcelled by those of any other city in the world. There are about 215 hotels in Manhattan alone. Among the newer hotels which have made their way up town are the New Astor, the McAlpin, the Knickerbocker, the New Plaza, the Majestic, the Waldorf-Astoria, the Manhattan, the Theresa, the Murray Hill, the Belmont, the Holland, the Savoy, the Biltmore and the New Netherland. Among the luxurious noted restaurants are Delmonicos', Martin's and Sherry's. The clubs of New York are important to the social life of the city. The oldest of these clubs is the Union League, organized in 1863. Among other noted clubs are the Metropolitan, the Knickerbocker, the Army and Navy, the University and St. Nicholas. The best known of the theaters of the city are the Broadway, the Belasco, the Lyceum, the Park, the Majestic, the Empire and the New Theater. The Metropolitan Opera House gave, in 1884, under Leopold Damrosch, the first season of German Grand Opera in America. The Hippodrome is one of the largest places of amusement. The Manhattan Opera House was built in 1903.

Trade and Commerce. New York is first in the United States in the importance and magnitude of its financial operations, and it shares with London, Paris and Berlin the distinction of being one of the four leading money markets of the world. Importations, especially of works of art, diamonds, sugar, coffee and rubber, and exportations of medicines, copper, machinery, illuminating oil and hardware are very large as compared with other ports. The number of vessels engaged in the coast trade is many times greater than the number engaged in the foreign trade, and the coast trade is much more valuable. The city is the largest center in America for the dry-goods and wholesale-grocery business. More than $20,000,000,000 of the securities of the country, representing over one-sixth of its wealth, are listed on the New York Stock Exchange.

Industries. The most important industry is the manufacture of clothing. This industry ranks first in the number of establishments, persons engaged, capital invested and value of products. In the printing, engraving and publishing business New York ranks above other American cities. Among the important manufactures are foundry and machine-shop products, paint and varnish, tobacco, bakery products, musical instruments, silk and lace goods, patent medicines, jewelry, millinery, malt liquors, cordage, lumber and slaughtering.

Government. The mayor of New York is elected for a term of four years. He appoints the heads of departments, with the exception of that of finance, and in this department he appoints two commissioners of accounts. He may remove all officers of his appointing with the exception of the members of the board of education and certain judicial officers. The mayor himself is subject to removal by the governor upon the establishment of charges preferred against him. The mayor is chairman of the board of apportionment and estimate, which consists of the comptroller, the president of the board of aldermen and the presidents of the several boroughs. Each October this board prepares the city budget for the ensuing year and the same is submitted to the aldermen for approval. Any action of the aldermen, who are not permitted to increase an ap-

propriation or to reduce that for state taxes, is subject to the mayor's veto, which can be overcome only by a three-fourths vote. Each borough president prepares all contracts relating to his borough, and he is chairman of each of the local improvement boards.

History. The first European to visit the vicinity was Verrazano, an Italian, who came in 1524. In September, 1609, Henry Hudson explored the harbor and the river, and a year later Dutch merchants dispatched several small vessels to engage in the fur trade with the Indians. When the West India Company came into existence in 1621 with chartered rights to the exclusive trade of the coasts of both North and South America, that body chose Manhattan Island for the seat of government and a shipping station. In 1626 Peter Minuit was appointed director-general of the Province of New Netherland, and he bought the entire island from the Indians for goods valued at $24. In 1638 was extended to all friendly European countries the privilege of trading with the West India Company. Minuit was later succeeded in turn by Van Twiller, Kieft and Peter Stuyvesant. The colony prospered and the place was incorporated as a city in 1653. The Dutch, however, did not long retain possession, as the English claimed the entire continent as having been discovered by Cabot.

In 1664 Charles II of England granted New Netherland to his brother, the Duke of York, who took possession of the city and renamed it New York. The Dutch regained the city in 1673 but gave way to the English a year later. In 1690 the first intercolonial congress was held in New York. In 1732 a stage line was established between New York and Boston. In 1790 the city limits were extended and in 1807 Fulton's steamboat, the *Clermont,* began running between New York and Albany. In 1812 a steam ferry was opened to Long Island. The Erie Canal was completed in 1825 and insured the commercial supremacy of New York among the American cities. The political history of New York during the first part of the 18th century was a turbulent one. In 1863 William M. Tweed organized a conspiracy to plunder the city. Col. Edward Waring, as head of the street-cleaning department, revolutionized New York in regard to cleanliness in 1898. The material prosperity of the city is steadily increasing.

Population. It is shown according to the Federal census that New York City adds about 125,000 inhabitants each year; moreover it is the greatest municipality in the world under one central governing authority. The large percentage of the city's foreign born makes it probably the greatest cosmopolitan city in the world. Population of Greater New York in 1920, 5,620,048.

Consult Moses King's *Handbook of New York;* Rand-McNally's *Handy Guide to New York City;* Lossing's *History of New York City;* F. B. Kelly's *Historical Guide to the City of New York;* R. R. Wilson's *New York, Old and New;* and M. J. Lamb, *History of the City of New York.*

New York, College of the City of. See College of the City of New York.

New York University, at New York City (1831). This is neither a city nor a state institution, but was founded by the private munificence of men and women who desired to aid in meeting the educational needs of a rapidly growing population. The University which is coeducational and nonsectarian has three centers—at First Avenue and 26th Street, at Washington Square and at University Heights, a campus of some 22 acres on a beautiful and commanding site above the Harlem River. The buildings on this campus represent a large investment and include the $750,000 library established by Helen Gould Shepard. The University is made up of: College of Arts and Pure Science, School of Applied Science, University and Bellevue Hospital Medical College, New York State Veterinary College, School of Law, School of Commerce, Accounts, and Finance, Washington Square College, Graduate School. There are over 8500 students enrolled.

New Zealand, *Ze' land,* **Domin'ion of,** a group of islands lying in the Southern Pacific 1200 m. e. of Australia, between 30° and 50° south latitudes. The Dominion, as organized in 1907, comprises North Island and South Island, together known as New Zealand, and Stewart and Cook islands, besides many smaller ones. The total area is 104,751 sq. m., of which North Island has 44,468 sq. m.; South Island, 58,525 sq. m.

Physical Characteristics. The coasts of North and South islands are rocky but indented by fiords remarkable for their scenery and furnishing excellent harbors, some of which are said to be the best of the southern ocean. There are two mountain ranges, which extend in parallel ridges in a northeasterly-southwesterly direction. The rugged beauty of their scenery and the many glaciers that descend their slopes remind the tourist of the Alps, although their height is less. In North Island are active volcanoes, near which is a remarkable region of geysers, hot springs, lakes and beautiful deposits of siliceous matter.

South Island has a large area of plains, almost perfectly level and forming a grazing land of exceptional size and richness. It is largely overgrown with grasses and yields quantities of New Zealand flax. The many rivers of the islands, though beautiful and capable of supplying power, are of little value for navigation because of their rapids, whirlpools and cataracts. The largest river and the only one of importance commercially is the Waikato in North Island. The climate of New Zealand is mild and pleasant in general; snow seldom falls except in the extreme south, but the high winds which prevail during certain seasons are sometimes uncomfortable.

Resources and Industries. The forests, which constitute fully one-third of the Dominion of New Zealand, or about 17,000,000 acres, are among its chief resources. The great tracts of pines yield annually about 414,000,000 ft. of timber and are carefully conserved so that the supply may not be exhausted or even diminished. One of the striking features of the wooded areas are the giant tree ferns that grow from 50 to 60 ft. in height and are of great beauty. The chief occupations of the islanders are those connected with the raising of live stock. The extended grazing lands support large herds of cattle, horses and sheep, and the chief exports are wool, frozen and preserved meats, tallow, hides, leather, live stock and dairy products. The staple grains are wheat, oats and barley.

In the mountains, gold, silver, coal, manganese and antimony are mined in large quantities, and some other minerals are mined in varying amounts. All the common European and American fruits are raised, including oranges and lemons, but so little of the land can be given up to orchards that some fruit must be imported. New Zealand is peculiar in having almost no native animals; the two most worthy of note are the wingless apteryx and the ground parrot. Nearly all other animals have been brought in from other countries.

History, Government and People. New Zealand was discovered by Tasman in 1642 and was visited by missionaries soon thereafter. It was established as a British colony in 1840. Since the establishment of the Dominion of New Zealand, the country has been divided into counties and boroughs. The chief executive is a governor appointed by the Crown, and the legislative department consists of an assembly of two houses. Wellington, on North Island, is the capital.

The natives of New Zealand, the Maoris, are an intelligent people of the Polynesian race. In early times they were cannibalistic savages with a genius for war, both offensive and defensive. There were many tribes and clans, no two of which were long at peace with each other. Their peaceful industries consisted in skillfully tilling the soil and artistically carving and decorating not only their homes but even the high rocky walls of their island home. Their tattooing gave to them the name of "Blue

Lips" when the first English settlers visited the island. Their advance in the past 50 years has been remarkable. Schools and colleges are common, and the native students are said to rival their English fellows in aptitude. The University of New Zealand and the Canterbury Agricultural College are the principal higher institutions. Since 1860 telegraph and telephones have become common, and over 2000 m. of railroad have been built. Every adult of New Zealand is a voter, and the Maoris are proud of the fact that the native women were given the ballot in 1893 at the same time it was given to white women on the islands. The Roman Catholic Church and the Church of England have the largest number of adherents. Population, 1,072,000.

Ney, *Na,* **Michel** (1769-1815), one of Napoleon's most famous marshals. He entered the army in 1788 and became, successively, lieutenant, captain, general of division and, in 1804, a marshal of the empire. He fought most efficiently for Napoleon, defeating the Austrians at Günzburg (1805), and engaging in the battles of Jena (1806) and of Eylau (1807). After his capture of the village of Friedland from the Russians on June 14, 1807, he became the idol of the army, and received from Napoleon the title *Brave des braves.* He later served with distinction in Spain and Portugal, and commanded the rear guard on the retreat from Moscow, by his energy and heroism saving the army from utter disorganization. Marshal Ney fought valiantly for Napoleon until after the Battle of Leipsic, but on the latter's abdication, he offered his services to the Bourbons. When Napoleon returned from Elba, Ney again took up the cause of his former chief, and led the last charge of the Old Guard at Waterloo. In December, 1815, he was found guilty of treason and was shot.

Nez Perce, *Na" Per" sa',* a tribe of North American Indians once ranging through Oregon, Washington and Idaho. They assumed a peaceful attitude toward the whites until 1877, when they rose in revolt because of being deprived of their lands. They were forced to go to Oklahoma, but in 1884 they were transferred to a reservation in northern Washington; not, however, until a large per cent had succumbed to disease in the South.

Ngami, *N'gah' me* a lake of South Africa, situated north of the Kalahari Desert, in Western Rhodesia. Formerly an inland sea, it is now diminishing rapidly, and it becomes merely a marsh during dry seasons, while at flood time it increases to a length of about 30 m. It was discovered by Livingstone in 1849.

Niag'ara Falls, N. Y., a city of Niagara Co., 22 m. n.w. of Buffalo, on the east bank of the Niagara River at the Falls, from which it takes its name, 13 m. s. of Lake Ontario, and on the New York Central & Hudson River, the Erie, the Wabash, the Michigan Central, the Lehigh Valley, the West Shore and other railroads. The International and the Niagara, St. Catherines & Toronto electric railways afford excellent transportation to the many points of interest. The city extends along the level cliffs from above the Falls for a distance of three miles below. Three bridges, one cantilever and two steel-arches, cross the river at this point. The upper steel-arch was when built the longest bridge of its kind in the world, being 1240 ft. long, with an arch span of 840 ft. In the southwest part of the city is Prospect Park, which, with Goat Island and several smaller islands, has been the New York State Reservation since 1885. This reservation is 107 acres in extent. The educational institutions include De Veaux College (Episcopal), chartered in 1853, Niagara University (Catholic), opened in 1856, a public library and a high school. Among the public buildings are the Niagara Falls Memorial Hospital, St. Mary's Hospital and the Federal Building.

The power of Niagara was first utilized extensively in 1861. A hydraulic canal was constructed above the Falls to conduct water to wheel pits. At the bottom of these pits large turbines have been placed, with dynamo-electric machines

NIAGARA FALLS AND RIVER

attached. After being utilized by the turbines, the water escapes through a tunnel to the gorge below the Falls. Several plants now generate electric currents aggregating over 325,000-horsepower. Three companies on the Canadian side of the river develop power also, and the total power development reaches at least 1,000,000-horsepower. The last treaty between the United States and Great Britain permits the diversion of 20,000 cu. ft. of water per second from the Niagara River on the United States side and 36,000 cu. ft. of water per second on the Canadian side.

Niagara power is now available throughout the territory extending eastward to Syracuse, 160 m. from Niagara, and westward to London in Canada, 125 m. from Niagara. The area within reach of existing Niagara power circuits in the United States and Canada is approximately 25,000 sq. m., and is traversed by a network of transmission lines having an aggregate length of more than 1000 m. Along the leading industrial establishments of the city of Niagara Falls are paper mills, foundries and machine shops, electrochemical works, flour and planing mills, aluminum works and manufactories of shredded-wheat biscuit, graphite, carborundum, emery wheels, haircloth, plated ware and gas machines. The city is also an important shipping point.

The vicinity and the city proper possess much of historic interest. Niagara Falls is one of the scenic wonders of the world and the city is visited annually by thousands of tourists. The separate villages of Niagara Falls and Suspension Bridge were consolidated in 1892 and chartered as the city of Niagara Falls. The Falls of Niagara were discovered by Hennepin in 1678. Population in 1920, U. S. Census, 50,760.

Niagara Falls and River. The Niagara River is about 33 m. long and flows northward from Lake Erie into Lake Ontario, draining lakes Superior, Huron, Michigan and St. Clair. It constitutes a part of the boundary between the State of New York and the Province of Ontario. At the beginning of its course river flows smoothly for 15 m. over a broad plain situated upon a plateau. It then branches at Grand Island, comes together again in a channel from two to three miles in width and dotted with islands. Farther on, the channel grows deeper and narrower and makes a gradual descent of 52 ft., giving rise to rapids. Beyond the rapids, the river, at this point 20 ft. deep, plunges 160 ft. over a ledge in two magnificent cataracts, the American Falls on the east and the Canadian, or Horseshoe, Falls on the west, the two being separated by Goat Island. On the American side the water, falling upon a mass of rock which has resisted its erosive force, is of no great depth; but on the Canadian side the water has excavated a basin as deep as the height of the Falls, in which the velocity of the water is temporarily retarded and the surface rendered sufficiently smooth to make possible the passage of a small steamboat, which carries visitors quite near the foot of the Falls. The spray in front of the Falls rises high in a mass of mist, its beauty enhanced by beautiful rainbows. The upper layer of rock projects outward, so that between the sheet of water and the wall of rock back of it there is a broad space that can be entered by visitors. That back of the American Falls is known as the Cave of the Winds; that on the Canadian side is reached by an elevator and has been fitted up with walks and platforms for the convenience of visitors.

The velocity derived from the fall of the water has caused the wearing down of the river's bed and the formation of a deep and narrow gorge (See RIVER) below the Falls, through which the water rushes at high speed, in places taking the form of rapids because of the boulders in its bed. About three miles below the Falls the channel makes an abrupt turn to the left; and here the impact of the current against the opposite bank has been such as to wear out a large circular basin and to give rise to a "boiling," seething, eddy known as the Whirlpool. This magnificent maelstrom and the rap-

NIAGARA FALLS

THOUSAND ISLANDS, ST. LAWRENCE RIVER

ids leading to it constitute a scenic feature rivaling the Falls themselves in interest. Below the Whirlpool the channel is not so steep, and at Lewiston the plateau ends in a steep cliff 250 ft. high, known as the Niagara Escarpment, which separates it from the coastal plain on the borders of Lake Ontario. At this escarpment the Falls began, probably with a much smaller quantity of water than they carry today, and during the thousands of years since that time have been gradually working their way backward. The Canadian side is retreating more rapidly than the American, averaging from four to six feet a year. The backward cutting of the rock is made difficult by an underlying rock stratum of hard limestone 80 ft. thick, which projects like a shelf at the top of the Falls and over which the waters are precipitated. Beneath this rock layer are strata of soft shales and sandstones.

The American Falls are 1060 ft. wide and of comparatively small volume; the Canadian Falls are 1230 ft. across, 3010 ft. if measured on the curve, and on top of the ledge have a depth of 20 ft. The Falls discharge at the rate of 500,000 tons a minute. Three bridges span the river just below the Falls, and on each side of the gorge an electric trolley facilitates sightseeing for the many visitors. The land on each side of the Falls has been converted into parks, which greatly enhance the beauty of the scenery. The State of New York reserves and controls 107 acres, and the Dominion Government 154 acres, called Queen Victoria Niagara Falls Park. Niagara Falls constitute one of the great scenic attractions of the world. No description of their beauty is adequate, and no conception of their grandeur can be formed until they are seen. See NIAGARA FALLS, N. Y.

Nibelungenlied, *Ne' be loong" en leet",* a celebrated ancient German epic, the story of which belongs to the general body of Germanic and Scandinavian mythology. Of unknown authorship, the poem is thought to have been first written down about 971 to 991 by a wandering minstrel and to have been remodeled by an Austrian knight about 1140. It was originally founded on the story of Sigurd in the *Elder Edda,* additions having been made from time to time. The events are represented as occurring about 430. The principal characters are Siegfried, King of the Nibelungs, in Nether Germany; Gunther, King of Burgundy, and his sister Chriemhild; and Brunhild, a heroine of the fabulous North. Siegfried was asked by Gunther to aid him in winning Brunhild to be his wife. Brunhild, who was to marry only a man who could conquer her, was won by the aid of a magic cloak, and Siegfried was rewarded by the hand of Chriemhild. Several years later in a quarrel between Chriemhild and Brunhild, the former boasted that it was her husband whose strength had conquered Brunhild. Thereupon Brunhild persuaded Hagen, a vassal of Gunther, to put Siegfried to death.

After a period of mourning, Chriemhild married Etzel, King of the Huns. In the meantime, the treasure of the Nibelungs, which had belonged to Siegfried, and which carried with it a curse for the possessor, had been seized and thrown into the Rhine by Hagen. In course of time Chriemhild invited her brother and Brunhild to visit her, planning to avenge the death of her first husband. A combat arose between the followers of Gunther and Etzel, and all of Gunther's people were slain. Chriemhild herself killed Gunther and Hagen, on the latter's refusal to tell where the stolen treasure was buried. Hildebrand, a vassal of Etzel, killed Chriemhild.

The language of the poem is simple but dignified, and it possesses great poetic beauty and dramatic power, ranking among the great epics of literature. Siegfried, Chriemhild and Gunther correspond respectively to Sigurd, Grimhild and Gunnar of the Norse legend. The *Nibelungenlied* has been the subject of many critical studies, and its story forms the basis of Wagner's musical drama *Ring des Nibelungen.* There are several English versions.

Nicæa, *Ni se' a,* or **Nice,** *Nees,* **Councils of,** two councils of the Christian Church, held at Nicæa in Bithynia. The first was convened in 325 by the Emperor Constantine for the purpose of harmonizing the existing differences in the Church, especially with respect to the views of Arius. The Arian theory was that Christ was the highest created being, but was not of the same essence as God the Father. This council decisively condemned this doctrine and adopted a confession of faith which asserted that both Father and Son are of the same essence. The council also settled the controversy concerning the time for observing Easter, favoring the Sunday following the day observed by the Jews, which was the 14th of the month Nisan. The second Council of Nicæa was convened in 786 by the Empress Irene and her son Constantine, and reassembled the following year. The occasion of the council was the imperial decree forbidding the use of images in religious services (See Iconoclasts). The council upheld the orthodox views as to image worship.

Nicaragua, *Nik" a rah' gwa.* See Central America.

Nicaragua Canal. See Panama Canal.

Nicaragua, Lake, a large lake in the State of Nicaragua, Central America. It is 100 m. long and its greatest breadth is 45 m. It is only 13 m. from the Pacific Ocean and is about 100 ft. above sea level. The lake contains a number of volcanic islands, two of which have peaks rising to the height of 5000 ft. The lake is drained by the San Juan River, which flows into the Caribbean Sea. This lake was to have formed an important section of the projected Nicaragua Canal. See Panama Canal.

Nice, *Nees,* a city of France, situated on the Mediterranean, 84 m. s.e. of Toulon and on a beautiful plain at the foot of the Maritime Alps, which enclose the city on the north and east so as to form an amphitheater. The city is divided by the Paillon River into the old town on the east and the new town on the west. In the old town the streets are narrow and crooked. The new town contains numerous public squares and boulevards and handsome public and private buildings. The industries include the manufacture of silk and cotton goods, paper, oil, leather, soap, straw hats, wines and numerous other articles. The city has an extensive trade in Southern fruits and cultivated flowers. Nice was formerly a city of Italy, but was ceded to France by Victor Emmanuel in 1860. Population in 1911, 142,940.

Nicene, *Ni seen',* **Creed,** the most important ancient formula of the Christian Church. This creed asserts that both the Son and the Father are of the same essence, a doctrine which was definitely confirmed at the famous Council of Nicæa (325). The text of the creed was based on the creed of Eusebius of Cæsarea, and was drawn up to combat Arianism, or the doctrine that Christ is not of the same essence as the Father (See Arius). The doctrinal teaching of the Nicene Creed is generally accepted by Christian churches.

Nicholas I (1796-1855), Emperor of Russia, was born in St. Petersburg. He received special education in economics and military science. The death of Alexander I in 1825 and the renunciation by his elder brother of his claims to the throne made Nicholas emperor. He began his reign by instituting some reforms, but soon changed his views and adopted an extremely reactionary policy. One of the greatest measures of his reign was the codification of the laws of Russia, begun in 1827 and completed in 1846. As the result of a war with Persia, Russia gained Armenia, and a war with Turkey gave Russia further increase of territory and free navigation of the Danube. The Kingdom of Poland was made a Russian province, and throughout Russia the tendencies towards Western civilization were gradually stamped out. In 1853 Nicholas brought on another war with Turkey, and this led to the Crimean War (See Crimean War). Nicholas died while this war was in progress.

Nicholas II (1868-1918), Emperor of Russia from 1894 to 1917, when he abdicated. He was the oldest son of Alexander III, and on the death of his father in 1894, he succeeded to the throne. In his reign he has allied himself with the reactionary and autocratic forces and repressed the political rights of the people. Alarmed by the revolt of the peasants and the activity of the Nihilists in 1905, at the close of the Russo-Japanese War, he promised the establishment of a legislative assembly or Duma. However, when the first Duma met in 1906 and demanded reforms in the government, it was dissolved. Nicholas II, emperor of Russia, has the melancholy distinction of being the last Czar to rule in Russia. Personally he desired for his people a more liberal form of government as shown by the institution of the Duma (which see), but he was not strong enough to withstand the reactionary tendencies of the corrupt bureaucratic government that was the curse of his country. Russia was one of the principal belligerents in the early days of the European War (which see). Betrayed by traitors in high places, Russia collapsed as a military power in the spring of 1917. Then the long repressed social revolution broke forth. Nicholas was forced to abdicate March 15, 1917, and was held a prisoner, first in the Crimea, then at Tobolsk, Siberia; he was finally executed by revolutionists in July, 1918.

Nicholas, Saint (? -326), a saint greatly reverenced in the Roman Catholic Church because of the miracles he is supposed to have worked. From early times feasts in his honor were held in England and Germany, on December 6th, and he became associated with and considered the patron saint of Christmas.

Nichols, *Nik' uls,* **Ernest Fox** (1869-), an American educator, born at Leavenworth, Kan. He graduated at the Kansas Agricultural College in 1888, and subsequently pursued graduate courses at Cornell, Berlin and Cambridge universities. He was professor of physics at Colgate University from 1892 to 1898, and then at Dartmouth College for five years. From 1903 to 1909 he was professor of physics in Columbia University, retiring to accept the presidency of Dartmouth. He is a member of numerous scientific societies, and a contributor to various technical journals.

Nicias (?-413 B. C.), an Athenian statesman and general. He was a political rival of Cleon, and of Alcibiades. He fought with success against the Spartans and Corinthians, and overran and devastated several districts, including Cythera and Laconia. In 421 B. C. he was instrumental in securing peace between Sparta and Athens, called the Peace of Nicias. In the fall of 415 B. C. he laid siege to Syracuse, although he was opposed to this expedition. After a brief success he was defeated, his fleet destroyed and he himself captured and slain, in 413 B. C.

Nickel, a silvery metal found in meteoric iron and in ores of sulphur and arsenic in mines of Ontario, eastern Canada and some islands of the southern Pacific. On account of the slowness with which it oxidizes, it is of great use in plating. German silver is an alloy of nickel and brass, and nickel coins are three-fourths copper and one-fourth nickel; nickel steel, which has only three per cent of nickel, is an alloy of steel of exceptional strength. Nickel coins have been in use in this country for over 50 years.

Niebuhr, *Ne' boor,* **Barthold Georg** (1776-1831), a German statesman and historian, born at Copenhagen. He studied at Kiel, London and Edinburgh, and held a position under the Danish Government, which he resigned in 1806 to enter the service of Prussia. In 1810 he was made royal historian and during that year and the two following he delivered lectures on Roman history in the New University of Berlin. These lectures were afterward published in two volumes. From 1816 to 1823 he represented Prussia at the papal court. During this time he did critical and original work on Roman history, resulting in *The History of Rome Down to the First Punic War,* a work of particular

value because it was the first history of Rome that was ever prepared by the critical method that distinguished between legend and history. He died at Bonn, Prussia.

Niehaus, *Ne' hous,* **Charles Henry** (1855-), an American sculptor of German parentage, born at Cincinnati. In his native city he studied at the McMicken School of Design, and afterwards in Munich, where his *Fleeting Time* won a first prize. He returned to America in 1881, and made a number of portrait statues of Americans. In the Connecticut State House are his statues of Hooker and Davenport; in the Congressional Library are statues of Moses and Gibbons; and at Richmond is a portrait statue of Lee.

Niger, *Ni' jer,* the third largest river of Africa. Its name among the natives is variously that of Joliba, Kwara, Issa and Mayo. It rises in the Sierra Leone, flows northeast, east and southeast and empties into the Gulf of Guinea through a wide estuary. Its total length is about 2600 m. and the area of its estuary is 14,000 sq. m. The course of the river is over gently sloping ground, and in the desert regions which it crosses, vegetation is found only along its banks. Its delta begins about 80 m. from the sea and consists principally of malarial swamps. Among the towns along the banks are Bamaku, Sego-Sikaro, Timbuktu, Gogo, Birni, Rabba and Lakoja.

Night'hawk", a bird of the Goatsucker Family, about the size of the robin. It may be known by its large head, short bill and very wide mouth gape, very long and pointed wings and short, weak feet, the front toes of which are connected by a web. The upper parts are black, mottled with gray; the under parts are white, black-barred; the wing has a white or buff-colored bar; the tail has a broad band; and the throat is white, bordered below by a black patch. The two eggs are laid on the bare ground in more or less exposed places and are spotted with black, brownish or gray and lavender. The nighthawk may be seen in the evening flying in a zigzag manner as it searches for night-flying insects, which it easily catches on the wing owing to the wide gape of the mouth and the presence of the mouth bristles.

Night Heron, a night-feeding bird of the Heron Family. The black-crowned night heron is about two feet long and is easily known by its black head and back, white forehead and throat, grayish wings and tail, and light gray sides and under parts. In the spring there are several long white plumes extending from the back of the crown. The nest is a rough platform of sticks placed in bushes or low trees or on the ground, and contains three to six bluish eggs. When disturbed or when flying they utter a gutteral "squawk." The night heron ranges from Canada south over most of South America. A related species, the yellow-crowned night heron, is bluish-gray, with black and gray stripes on wings and back; it is black on the chin and sides of neck, and has a yellowish-white crown.

NIGHTINGALE

Night'ingale, a bird of the Kinglet Family. It is smaller than the robin (six inches), and is reddish-brown above and whitish or grayish below. The nest is large, and is composed of dead leaves and grasses and lined with grass, rootlets and hair. It is placed in a dense

hedge or thicket near the ground, and four to six olive-brown eggs are laid. The nightingale is a valuable bird to the agriculturist, feeding largely upon insect larvæ. It is found throughout Europe and extends to northern Africa and western Asia. The nightingale of Persia is thought to be the "bulbul" of the poets. Its beautiful song is heard more often at night than in the daytime.

And hark! The nightingale begins its song,—
Most musical, most melancholy bird.
A melancholy bird? Oh, idle thought.
In nature there is nothing melancholy.
.....'Tis the merry nightingale
That crowds, and hurries, and precipitates
With fast, thick warble his delicious notes.
—*Coleridge.*

Nightingale, Florence (1820-1910), an English philanthropist, best known for her work as an army nurse. Early becoming interested in hospital work, she visited various hospitals of Europe, and was trained as a nurse by the Sisters of St. Vincent de Paul in Paris, and by the Protestant Sisters of Mercy at Kaiserswerth, on the Rhine. At the outbreak of the Crimean War, in 1854, she organized a band of nurses and established the great hospital at Skutari, in the Crimea. Her efforts here revolutionized army nursing, but her health failed because of overwork. At the close of the war she was received in England with great enthusiasm, and was presented by the British people with $250,000, with which she established at St. Thomas Hospital, London, the Nightingale Home for the training of nurses. For several years she superintended this school, but in the eighties she retired from active life, meanwhile, however, during the Civil and the Franco-German wars, giving valuable advice regarding field and camp hospitals. She never married. Among her friends were Lord Salisbury, Gladstone, Henry Ward Beecher and Canon Farrar. In 1907 she received the Order of Merit, being the first woman so honored, and in 1908 she received the freedom of the city of London, being the second woman to whom this distinction was accorded. Miss Nightingale wrote *Notes on Hospitals, Notes on Nursing* and *Life or Death in India.*

Night'shade", a family of herbs including the eggplant, horse-nettle, potato, bittersweet and common nightshade. The latter is a low, much-branched weed, not prickly, as many members of this family are. The leaves, which are smooth and oval in shape, with wavy or toothed margins, have a peculiar arrangement due to a lengthening of the stems which bear the flower clusters. The leaves are carried up on the stem and form a cluster with the bracts, or leaflets which surround the flower. The flowers are small and white with five or more divisions. The fruit is a small blue-black berry, which is more than half surrounded by the calyx.

Ni'hilism, a general term used to define a Russian socialistic movement. In Russia the word *nihilist* was first applied by Turgeniev to the hero of his novel *Fathers and Sons.* The Nihilist Party began its liberal agitation about 1818, and during the reign of Alexander III adopted a program of positive reform, the object being to destroy all forms of government and annihilate all class distinctions. In the early part of 1870 a socialistic propaganda was spread among the serfs by many young people of the upper classes, who voluntarily distributed socialistic literature, but in 1874 the Russian Government began to interfere; the newspapers which advocated the Nihilist doctrine were suppressed and large numbers of the revolutionists were tried and condemned to death or Siberian exile. Thereafter the Nihilists adopted a more secret policy, but before the World War the police discoveries show that Nihilism was spreading and secret affiliations are known to have existed between its adherents in Russia and those in other countries.

Nile, the largest river of Africa, and next to the Missouri-Mississippi, the longest in the world. It extends from Victoria Nyanza to the Mediterranean Sea, a distance of 3670 m. There are four parts, the Upper, Middle and Lower Nile and the Delta. The Nile

flows out of Victoria Nyanza, and its course is alternately peaceful and interrupted by falls and rapids until it reaches the Albert Nyanza, from which it emerges at the northern end and continues its course as the Bahr-el-Jebel, receiving several tributaries. At Khartum it receives the Bahr-el-Azrak, or Blue Nile, and 180 m. below the confluence, the waters of the Atbara fall into it. After this point it flows in a remarkable course of 1800 m., without being joined by a tributary, is lost here and there in the swamps and grasslands, and continues through a valley or cleft in the desert plateau, the sides of which often rise to a height of over 1000 ft.

The rainfall in the highlands of Abyssinia determines the supply of water in the Nile, its rise and fall, and, in turn, the change of seasons. The heavy rains begin in April, and the floods descend upon Cairo about June 15. Two or three weeks later the amount increases rapidly, even to the rate of three feet per day, and continues until October and later. These annual inundations account for the existence of Egypt in history, for they have the distinction of having turned the land from a desert into a rich agricultural region, and have established the security of farming by reason of the loamy soil deposits which they carry. Attempts have recently been made to store this abundant water supply, and an efficient system of irrigation is now maintained (See IRRIGATION). One of the great obstacles to navigation of the Nile, principally between Khartum and Gondokoro, is the heavy vegetation growth, known as sudd, on the surface of the stream. The masses of weed grow so insistently deep and strong that in places they have been found able to support the weight of the hippopotamus. The Cape-to-Cairo Railway, with its connections, cuts its way through this part of the continent chiefly along the Valley of the Nile.

Niles, Ohio, a city of Trumbull Co., 5 m. s.e. of Warren and 58 m. s.e. of Cleveland, on the Mahoning River at the mouth of the Mosquito Creek, and on the Pennsylvania, the Erie and the Baltimore & Ohio railroads. Niles is primarily a manufacturing center, but its prosperity is partially derived from operations in iron and bituminous coal, which are mined in the vicinity. There are rolling mills, blast furnaces, boiler works, tin-plate mills, steam- and electric-car shops, galvanized-iron shops and manufactories of printing presses, fire brick, incandescent lamps, chinaware and iron-foundry products. The town was incorporated in 1864 and chartered as a city in 1895. Population in 1920, 13,080.

Ninebark, *Nine' bark",* a common, ornamental shrub of the Rose Family, found in western United States growing along the banks of streams or bending over country roads. The stem is smooth, with slender curving branches and leaves almost as long as broad. These leaves are often cut into three or five blunt lobes and are long-stemmed. Their edges are finely-toothed and their color is bright green. The flowers grow in rounded clusters nearly three inches across. They are white or purple-tinted in color and are generally in bloom the last of June. The individual flowers are small, with a five-lobed, bell-shaped calyx and five rounding petals. The fruit is a smooth, dark-colored pod containing two seeds. The name ninebark was given because of the way in which the layers of the bark peel. In the South a shrub of the Saxifrage Family is called ninebark.

Nin'eveh, the ancient capital of the Assyrian Empire, situated on the Tigris River opposite the present town of Mosul. About 606 B. C. Nineveh was captured and destroyed by the Medes and Babylonians. The site of the city long remained unknown. In 1842 Botta began excavations on the supposed site of the left bank of the river, where great mounds indicated buried mines. He was followed by Layard and others. The excavations brought to light ruins of palaces, numerous sculptures, a royal library, innumerable small objects and elaborate walls. The British Museum contains many of the relics.

Ning'po', a seaport of east-central China open by treaty to foreign commerce and of importance for its exports of tea, drugs, silk, raw cotton and mats. It has many interesting buildings, including the great library, temples, cloisters and schools. There are manufactories of gold and silver articles, silks, confectionery, lacquered ware and carved wood. The population is estimated at 400,000.

Niobe, *Nī o be,* in Greek myths, daughter of Tantalus and wife of King Amphion of Thebes, by whom she had

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seven sons and seven daughters. For boasting of her progeny to Latona, who had but Apollo and Diana, all her children were killed. In an excess of grief, Niobe was changed into a stone, from which her tears, in a trickling stream, ever flowed.

Niobe and Her Children, a masterpiece in statuary, is in the imperial gallery of Florence.

Nip'igon, Lake, a body of water situated in the northwestern part of Ontario, Canada, about 30 m. n. of Lake Superior. It is about 70 m. long and about 40 m. wide and has a very rocky and irregular coast line. The lake is deep, and contains over 1000 wooded islands. Several small streams feed it, and the outlet is through the Nipigon River into Lake Superior. It is noted for its scenery.

Nip'issing, Lake, a lake situated in Ontario, Canada, about midway between Lake Huron and the Ottawa River and northeast of Georgian Bay. It is about 55 m. long and about 20 m. wide, but the shores are very irregular. The lake contains numerous islands, some of which are inhabited by Indians. It is fed by the Sturgeon River, and the French River is the outlet. The lake was first visited by Le Caron, a Récollet priest, in 1614, and was a favorite meeting place for the French fur traders and the Indians during the early period of Canadian history.

Ni'san, in the Jewish calendar the first month of the sacred year and the seventh of the civil year. It answers nearly to our March. The original name was Abib, but after the Captivity it received its present name.

Ni'ter. See SALTPETER.

Ni'ton, a newly-discovered element which is found in the waters of many springs and is said to give them curative properties. It is one of the so-called emanations from radium and is the gas which remains after the helium particles have broken away from radium. The rate of disintegration is very slow, and after 1760 years one ounce of radium will have changed into half an ounce of helium and niton, leaving one-half ounce pure radium. After another 1760 years a quarter of an ounce of the remaining radium will have changed, while one-quarter of an ounce still remains radium. So the process continues in a never-ending period of decay. Niton, like oth-

ers of this group, helium and argon, is an inactive element which forms compounds with no other elements. Its own existence is less than four days, when it in turn changes to another substance. Niton can be solidified into an invisible icelike stick whose presence is made known only by the brilliant light which it gives. Liquid nitron gives a beautiful violet light, although, seen itself, it is a colorless liquid. Sir William Ramsay, the discoverer of niton, claims that 75 per cent of the curative properties of radium are due to the presence of niton.

Ni'tric Acid, or **Aqua Fortis,** *A' kwa For' tis,* an acid well known since the time of the alchemists. Its constituents were not known, however, until discovered by Cavendish and Lavoisier in the latter part of the 18th century. Nitric acid is a fuming, colorless liquid having a penetrating odor and such strength that it causes severe skin wounds when concentrated and even if diluted stains the skin yellow. It gives up its oxygen so readily that sawdust and similar substances ignite if brought into contact with it. Nitric acid is prepared commercially by the mixture of potassium or sodium nitrate and sulphuric acid, in cast-iron vats lined with fire brick and built into the furnace so that they may have uniform heat. The resulting fumes are passed through a tower filled with charcoal through which water is constantly trickling; this absorbs the peroxide of nitrogen which would otherwise escape. The acid is also produced in small quantities in the decay of animal or vegetable matter which contains nitrogen, or in the passage of the electric spark through moist air.

When hydrochloric and nitric acids are mixed, a solution called aqua regia is obtained; this combination of acids dissolves gold, platinum and other substances not acted upon by either acid alone. Its name, meaning royal liquid, was given by the alchemists because of its ability to dissolve the royal metal, gold.

Nitrobenzol, *Ni" tro ben' zole,* or **Ni"troben'zene,** a nitrogen compound manufactured from benzene, one of the lighter oils of coal tar. It is a yellow, oily liquid having a sweet taste and a suffocating odor. Nitrobenzol is highly poisonous, and the inhalation of its vapors may cause death. It is insoluble in water, but easily soluble in alcohol and ether. Commercially, it is a constituent of many perfumes, but its chief use is in the production of aniline for dyeing purposes.

Nitrobenzol is prepared by mixing benzene, sulphuric acid and nitric acid slowly in a large iron tank where the temperature can be kept low until they are thoroughly mixed, after which the mixture is heated to about 80° C. The resulting compound is then diluted and the nitrobenzol distilled off. To render it perfectly pure, a process of drying and purification is also necessary.

Nitrogen, *Ni' tro jen,* a colorless gas discovered by Rutherford in 1772 and formerly called azote. It is considered inactive, though it acts readily upon tungsten, magnesium and titanium, causing them to become incandescent. Fully four-fifths of the air by volume is nitrogen, and there it acts as a weakener of the oxygen, which would otherwise be too active. Nitrogen is not a supporter of respiration or combustion; thus it suffocates animals confined in it, though it is not a poison.

With hydrogen, nitrogen forms the common gas ammonium; its chief acid, nitric acid, which was known to the alchemists, in the ninth century, is well known for its corroding power on most substances. Potassium nitrate, called saltpeter, and sodium nitrate, Chile saltpeter, the principal salts of this acid, are used in making gunpowder. Many nitrogen compounds, especially Chile saltpeter, are of great value as fertilizers since all plants require much nitrogen to build up their tissues. The saltpeter beds are so rapidly becoming exhausted that experiments are being made by the bureau of manufactures in the Federal Department of Agriculture to transform the plentiful nitrogen of the atmosphere into a form suitable for use. As the at-

mospheric nitrogen over one square mile of land is 22,000 tons, the supply from this source is practically inexhaustible. In Norway a process of extracting the atmospheric nitrogen by means of electric furnaces is already in use, but though the product rivals the Chile saltpeter, the furnaces are as yet not wholly efficient. See NITRIC ACID; SALTPETER; AMMONIA; FERTILIZER.

Nitroglycerin, *Ni" tro glis' er in,* or **Glonoin,** *Glon' o in,* an explosive substance consisting of a mixture of sulphuric and nitric acids and glycerin. It is an oily liquid without odor or color. It is made by pouring the glycerin into the mixture of acids and stirring the mass and cooling it by cold water during the operation. When brought in contact with a red-hot iron or an electric spark, or violently jarred, nitroglycerin explodes with a force 13 times as great as that of gunpowder. In its liquid state it is very dangerous to handle and especially to transport; hence it is usually made at the place where needed for immediate use. Mixed with clay it forms dynamite and cordite. In its pure state it is used for blasting under water and loosening the earth around the base of oil wells to increase the flow of petroleum. It is also employed to some extent in the manufacture of smokeless powder. See BLASTING; DYNAMITE; SMOKELESS POWDER.

Nizhni-Novgorod, *Nyez' nye-Nov' go rot,* a town of Russia, capital of the government of the same name, situated at the confluence of the Oka and Volga rivers, 272 m. by rail e. of Moscow. The town consists of three parts: the upper, including the citadel; the lower and the fair grounds. Among the chief buildings are monasteries, old churches, a military school, a technical school and a theological seminary. The Kremlin, or old fort, commands a striking outlook over the Volga. The annual fair, held from July 29 to Sept. 10, was instituted in 1817. It exercises a wide influence on prices of goods and on the trade in Russia, Siberia and Turkestan. The shops used for the fair number about 8000. As early as 1221, a fort was established on the present site of the town. The death rate in the city exceeds the birth rate; at the time of the fair the visitors equal in numbers the regular inhabitants. Population, about 95,000.

No'ah, a patriarch of the Old Testament, son of Lamech. The book of *Genesis* records his being chosen by God to be the father of the new race which would dwell on earth after the Deluge. Being warned of the coming flood and under direction of the Divine Spirit, he built a great Ark, within which he and his family, and all manner of animals, took refuge. When the waters had subsided, the Ark rested on Mt. Ararat, where Noah was assured that the earth would never again be destroyed by water, a rainbow in the clouds being given as a sign of this promise. Noah's three sons, Ham, Shem and Japheth, according to Scripture, became the progenitors of the three great branches of the human race after the flood.

Nobel' Prizes, the prizes left in 1896 by the will of Albert Nobel, the Swedish inventor of dynamite. Nobel left an estate of about $9,000,000, the interest of which is divided yearly among five recipients of prizes, in the following manner: Award is made (1) for the most important discovery or invention in physics; (2) the most important discovery or improvement in chemistry; (3) the most important discovery in physiology or medicine; (4) for the most idealistic work in literature; (5) for the best work in the promotion of universal peace.

The first and second prizes are awarded by the Royal Academy of Science in Stockholm, the third by the Caroline Medical-Chirurgical (surgical) Institute in Stockholm, the fourth by the Swedish Academy in Stockholm and the fifth by the Norwegian Storthing (Parliament). Every candidate must be proposed by writing, by some duly qualified person, and every literary work must have appeared in print. The prizes are announced on Dec. 10 following the award, and a diploma and gold medal

are given with the prize. Within the following six months it is expected that the winners of the first four prizes will lecture at Stockholm upon the subject for which the prize is given. The lecture for the peace prize is given at Christmas. The prizes average $40,000. Among Americans, Theodore Roosevelt was awarded the peace prize in 1906; Senator Elihu Root received the peace prize for 1912; Prof. Albert A. Michelson was awarded a prize in 1907 for his valuable discoveries in physics. Dr. Alexis Carrel, a native of France, but a resident of the United States, was awarded the prize for medicine in 1912.

Up to 1912 three women had been recipients of prizes. One was awarded to Madame Curie for researches in physics, in 1903, and one for researches in chemistry, in 1911; one to Selma Lagerlöf, in 1909, for idealistic work in literature; and one to Bertha von Suttner, in 1905, for the promotion of peace. Writers of world-wide reputation winning the prize for literature include Theodor Mommsen, the historian; Björnstjerne Björnson, the Norwegian writer; Henryk Sienkiewicz, the Polish novelist; Rudyard Kipling; Maurice Maeterlinck, the Belgian writer; and Gerhart Hauptmann, the German poet, dramatist and novelist.

Nod'dy, a sea bird of the Tern Family, living on tropical coasts from Florida to Brazil. It is 16 inches long and in color it is blackish-brown, with a whitish head; the tail and the wings are long and the feet webbed. The nest is made of sticks and is usually placed in mangrove trees. The eggs have reddish-brown markings and are sought as food in the West Indies. This bird, like the booby, is stupid and allows itself to be picked up without flying.

Nogi, *No' ge,* **Kiten,** Baron (1849-1912), a Japanese general and statesman. He belonged to the Samurai caste of feudal Japan, and fought the Latsuma Rebellion. Following the Japanese-Chinese War of 1895, he became governor of Formosa, in which capacity he distinguished himself, and in the war between Russia and Japan conducted the siege of Port Arthur from May, 1904, until the following January. He then joined Oyama, and was conspicuous at Mukden (See Russo-Japanese War). With his wife, Count Nogi committed suicide in September, 1912, out of respect to his dead ruler, Emperor Mutsuhito.

Non-Importation Agreement, in American history, a compact entered into by merchants of New York and Boston, in 1765, in which they pledged themselves to order no new goods from England and to cancel old orders. This was among the first acts of retaliation for the Townshend Acts, and it came soon after the Stamp Act. Virginia next adopted resolutions in support of non-importation and other colonies soon followed her example. As a result of this policy, exportations to New England and the Middle colonies alone were reduced two-thirds of their previous value in one year, while the total exportations from England fell off one-half. The agreement was strictly observed until 1770, when all duties save that on tea were repealed, and only tea was prohibited. See Stamp Act; Townshend Acts; Revolutionary War in America.

Non-In'tercourse Act, in American history, an act of Congress passed in February, 1809, and signed by Jefferson on March 1. As a substitute for the Non-Importation Act and the embargo, it went into effect March 15, on which day American vessels could once again engage in a limited foreign trade, but were still under bonds not to have any commercial intercourse with France or England or their dependencies. The act was revived June 28, 1809, May 1, 1810, and March 2, 1811. See Embargo Act; War of 1812.

Nordenskjöld, *No" ren shul',* **Nils Adolf Eric,** Baron (1832-1901), a Swedish naturalist and Arctic explorer, born in Finland. Soon after receiving his master's and doctor's degrees from the University of Helsingfors in 1857, he became curator of the mineralogical department of the Swedish Royal Mu-

seum in Stockholm. He took part in all subsequent Arctic expeditions sent out by the Swedish Government, seven of which he led. In 1870 he explored Greenland, and some five years later he headed two expeditions across the Kara Sea and up the Yenisei River. Leaving Sweden in June, 1878, he successfully made the Northeast Passage and wintered in the ice near Bering Strait, reaching Yokohama in September, 1879. He returned to Sweden by way of the Suez Canal, thus being the first to circumnavigate the Continent of Eurasia. See POLAR EXPLORATIONS.

Nor'dica, Lillian (1859-1914), an American singer whose maiden name was Lillian Norton, was born in Maine. She studied in America and later in Milan, making her operatic début at Brescia in *La Traviata* under the assumed name Nordica. She attained fame in Italian rôles but achieved her greatest success in difficult parts of Wagner opera. She returned to the United States in 1895, and at once won recognition as one of the leading sopranos of her time.

Norfolk, *Nor' fok,* **Va.,** an independent city of Norfolk Co. and a port of entry, situated in southeastern Virginia 8 m. from the mouth of the Elizabeth River, on the Albermarle and Chesapeake and the Dismal Swamp canals. It lies 90 m. s.e. of Richmond and is on the Atlantic Coast Line, the Seaboard Air Line, the Southern, the New York, Philadelphia & Norfolk, the Chesapeake & Ohio, the Norfolk & Western, the Norfolk & Southern, the Virginian and other railways, and is served by many foreign steamship lines and by ferries connecting it with Portsmouth, Newport News, Old Point Comfort and Hampton. Many electric lines extend to near-by points of interest and to adjacent cities, and supply the city with excellent street-car service. The city has about 175 m. of streets, nearly all of which have been paved and put into fine condition. In general, they are well shaded, and the homes which lie along them have well-kept lawns and trim curbs. There is a large city park of 114 acres and several smaller parks, all attractive in appearance. Not far from the city are many delightful summer resorts, such as Virginia Beach, Ocean View, Old Point Comfort, Pine Beach, Willoughby Beach and Cape Henry. Beautiful drives to most of these and to other points of interest add to the city's charms.

The noteworthy buildings of the city include the city hall, the custom-house, the Federal Building, the cotton exchange, a large city market and a well-stocked public library. There are several hospitals, including St. Vincent's, St. Christopher's, the Naval, the Sara Leigh and the Norfolk Protestant; and excellent churches, among which is historic St. Paul's, built in 1737 and having in its churchyard one of the oldest cemeteries of the United States. Aside from the public schools, with the fine new high school building, Norfolk is the seat of the Norfolk Mission College, St. Joseph's Colored School and Norfolk Academy. Norfolk is the largest coaling station in the United States, and its immense coal docks are crowded with traffic. It is also a shipping point for lumber, garden truck, fish and oysters, besides being the largest peanut market of the world. Its importance as a port has aided in making it a manufacturing city as well. There are fully 350 manufacturing plants, including the extensive ones connected with the peanut industry. The city is third in the state in the value of its manufactured products.

Norfolk was founded in 1682 by act of the Virginia Assembly, which recognized its site as a remarkable one for purposes of trade and commerce. It became a city in 1845, and its present charter was given in 1906. In government it is wholly independent of Norfolk County, of which it is geographically a part. During the Revolutionary War, Norfolk was partially burned by its citizens to prevent its occupation by the British. In the Civil War it was abandoned by the Federal troops, who in 1861 burned the navy yards and then left it to the Confederate forces. De-

fending the harbor are Fortress Monroe and Ft. Wool, the first a historic fort of the Civil War (See FORTRESS MONROE). A few miles from the city lie the ruins of Jamestown, the first permanent English settlement in America. Population in 1920, U. S. Census, 115,777.

Normal School, a school especially designed for the professional training of teachers. As the term is ordinarily used, it means a school for training teachers for elementary schools. Those institutions which prepare teachers for more advanced grades of work are styled teachers' colleges or schools of education.

Normal schools had their origin in Germany, where the first successful one was established at Rhiems in 1681. In the early part of the 18th century normal schools were to be found in Prussia and France. They were introduced into the United States through Horace Mann, who, when secretary of the Massachusetts Board of Education, induced the Legislature of that state to appropriate $10,000 for the purpose. This was supplemented by the gift of an equal sum from individuals who were interested in the movement. The first school was established at Lexington in 1839, and the following year others were established at Westfield and Bridgewater. New York followed Massachusetts and established a normal school at Albany which has since become the Albany Normal College. The success of these early schools was such that others soon followed, and by 1860 normal schools had become recognized as a part of the educational system of nearly every state in the Union. Most of these schools are state institutions, deriving their support entirely from the state and being managed by state boards. Tuition is free, but some schools collect a small fee for incidentals. The course of study is prescribed by the faculty usually in consultation with the board of control and the state superintendent of public instruction. Requirements for admission are usually fixed by legislation. In some states the diploma is a teacher's certificate, which allows the holder to teach in the public schools without further examination. In other states the graduates of normal schools must pass the required examination to procure a certificate. There are only a few private normal schools in the United States.

Nor'mandy, an ancient province in the northern part of France, bordering on the English Channel. It is now divided into the departments of Seine-Inférieure, Eure, Orne, Calvados and La Manche. The capital was formerly Rouen; other important towns within its borders are Dieppe, Havre, Harfleur, Yvetot, Caen and Cherbourg. The Franks seized the territory after the Roman power declined, and it received its name when it fell into the hands of the Norse invaders, under the leadership of Hrolf, or Rollo. In 1035 William II became Duke of Normandy; after he established a Norman dynasty on the English throne in 1066, Normandy was annexed to that country. While ruled by his son, after William's death, it was separated from England, was reunited to it under Henry I in 1106, and was conquered by Philip Augustus of France in 1203. Several times retaken by the English, it became a permanent possession of France in 1449, and now represents one of the most productive parts of that country.

Nor'mans, the name applied to those colonists from Scandinavia who settled that part of France which was called, after them, Normandy. Originally called Northmen, they began to make piratical expeditions to the coasts of Gaul before the end of the reign of Charlemagne, and by 845 they had ascended the Seine and sacked Paris. In 912 the Carolingian ruler, Charles the Simple, granted Rollo, the leader of the Northmen who had settled at Rouen, possession of all the land in the Seine Valley from the Epte and Eure to the sea. Henceforth this region went by the name of Normandy, and the name Northman became softened into Norman. The Normans readily adopted the religion, manners and speech of the inhabitants of their new country, and in the 12th century de-

veloped a school of narrative poetry (See TROUVÈRE). The old Norse spirit of adventure, however, never became extinct, and in the 11th century many Norman nobles and their followers sought an outlet for their warlike instincts in southern Italy. Robert Guiscard was in 1059 recognized by Pope Nicholas II as Duke of Apulia and Calabria, and his brother Roger conquered Sicily. The Normans of Italy were also prominent in the Crusades. The most important enterprise of all was the Norman Conquest of England in 1066, when William the Conqueror established a new dynasty in that country.

Nor'ris, Frank (1870-1902), an American novelist, born in Chicago, Ill. After studying art in Paris from 1887 to 1889, he studied literature at the University of California and at Harvard. In 1891 his first novel, *Yberville,* dealing with Spanish life in Old California, appeared, and eight years later his novel *McTeague* attracted public attention. During the Jameson Raid he was correspondent in South Africa for the San Francisco *Chronicle;* he edited the San Francisco *Wave* in 1896-97 and was war correspondent in Cuba in 1898. Two years later he published *Moran of the Lady Letty.* In 1901 appeared *The Octopus,* the first volume of the trilogy he had planned, which was to be an "epic of the wheat." It was followed by *The Pit,* containing many vivid descriptions of the battles on the exchange. The third volume, *The Wolf,* was outlined, but left incomplete at the time of his death.

Nor'ristown, Pa., a borough and county seat of Montgomery Co., 18 m. n.w. of Philadelphia, on the Schuylkill River at the mouth of Stony Creek, on the Schuylkill Canal and on the Philadelphia & Reading, the Pennsylvania, the Stony Creek and other railroads. The borough is connected by bridges with Bridgeport on the opposite side of the river, where cotton and woolen goods are extensively manufactured. Norristown is delightfully situated and commands fine views of the Schuylkill Valley. The borough is a popular residential suburb for many Philadelphia business men who enjoy the rural environment and city comforts. The main artery in the system of electric railways is the Schuylkill Valley line connecting Philadephia and Pottstown, with connections for Reading, Boyertown, Torresdale and the many intervening towns and villages, which include Conshohocken, Collegeville and Lansdale; also the Philadelphia & Western, from Allentown to Philadelphia. Valley Forge is six miles distant. Norristown, in point of everything save charter, is a city and claims to be the largest borough in the world.

Norristown has many miles of broad and well-paved streets, surrounded by lawns and gardens. There are a number of parks maintained by the borough. Among the noteworthy buildings are the Montgomery County Courthouse, city hall, Federal building, Masonic Temple, a number of banks and municipal buildings. There are about 40 churches. The educational institutions include a high school, public and parish schools, Montgomery Historical Society, the Norristown and McCann public libraries, a business college, Commercial and Motor-Boat clubs and a Chamber of Commerce. The industries of Norristown are represented by carpet, cotton and woolen mills, foundries and machine shops, radiator works, knitting-machine works, screen works, a magnesia factory, patent-medicine laboratories, shirt factories, hosiery mills, broom factories, fiber works, cigar factories and asbestos works.

Norristown was founded in 1785 and named in honor of Isaac Norris, a friend of William Penn and member of the State Legislature, who had owned the land upon which the borough is built. Norristown was incorporated in 1812. Population in 1920, 32,319.

North, Christopher. See WILSON, JOHN.

North, Frederick, EARL OF GUILFORD (1732-1792), prime minister of England during the American Revolution. After receiving his education at Eton and Cambridge, he entered the House of

Commons as a Tory at the age of 22. As lord of the treasury he advocated the Stamp Act and the right of England to tax the colonies. He became prime minister and first lord of the treasury in 1770 and remained in office until 1782. As head of the government he managed the war for George III and supported his American policy, but resigned when it failed. During the last five years of his life he was totally blind. He succeeded to the title of Earl of Guilford two years before his death.

North Adams, Mass., a city of Berkshire Co., 36 m. e. of Albany, N. Y., on the Hoosac River near the west end of the Hoosac Tunnel, and on the Boston & Maine and the Boston & Albany branch of the New York Central Railroad. Five miles southwest is Greylock, the highest mountain in the state, and the city is surrounded by the beautiful scenery of the Berkshire Hills. Within the corporate limits of North Adams are the villages of Beaver, Brayton, Greylock and Blackington. The principal industrial establishments are machine shops, cotton and woolen mills and print-goods and boot and shoe factories. There is also a large trade in farm and dairy products. A state normal school is located here and there are many fine public buildings. Population in 1920, U. S. Census, 22,282.

North America, the third largest in size among the grand divisions of the globe. It lies in the Western Hemisphere and extends from 9° to 70° 26′ north latitude and from 47° 30′ to 168° west longitude. The narrow Isthmus of Panama connects it with South America; Bering Strait separates it from Asia to the northwest.

Size. From north to south its length is about 4500 m.; its greatest breadth from east to west is over 3000 m. The total area is about 8,300,000 sq. m. Like South America, its form is triangular, with the base at the north and the apex at the south. The coast line, however, is different from that of the neighboring grand division to an extraordinary degree. It is extremely irregular, containing large gulfs and inlets and several great peninsulas. The Arctic Ocean bounds the continent on the north; the broken coast of the Atlantic Ocean is on the east; the fairly regular western shore is washed by the Pacific Ocean.

Coast Waters. On the north is Hudson Bay, projecting far inland into the Dominion of Canada. South of it are the Gulf of St. Lawrence and the Bay of Fundy. The Atlantic coast contains Massachusetts Bay, Long Island Sound, Delaware and Chesapeake bays and Albemarle and Pamlico sounds. On the south are the Gulf of Mexico and the Caribbean Sea, together with the gulfs of Campeche, Colon and Honduras. The western coast has few indentations, except the Gulf of California, San Francisco Bay and Puget Sound. The chief peninsulas are those of Labrador, Nova Scotia, Florida, Yucatan, Lower California and Alaska.

Islands. North of the continent is the group of islands known as the Arctic Archipelago, to a great extent, merely frozen wastes of land of no importance. Greenland lies to the northeast, and along the eastern and southern coasts are Newfoundland, the Bermudas, the Bahamas and the West Indies. Queen Charlotte's and the Aleutian Islands are on the west.

Physical Features. The two Americas are similar in relief in so far as the large mountain system, the Cordillera, extends along the western coast of both. In North America a broad valley succeeds this elevation on the east, and is in turn succeeded by the Appalachian range along the eastern coast.

Highlands. The western highland system or Cordillera, consists of the Rocky Mountain system, the Cascades, the Sierra Nevada and the Sierra Madre mountains. These ranges and their peaks reach their highest elevations in the states of Colorado and California. The greatest width of the Rocky Mountains is over 1000 m.; the height varies from 3000 to 10,000 ft. (See Rocky Mountains). The Sierra Nevadas extend in part the length of California, and

contain mounts Corcoran, Whitney and Shasta. From the Sierra Nevadas stretches a continuation known as the Cascade Range, extending through Oregon and Washington into British Columbia (See CASCADE RANGE). The mountains of the continent culminate in Alaska in Mt. McKinley, 20,464 ft. high. West of the Cascades is the lower Coast Range extending along the coast through northern California, Oregon and Washington. In Mexico are the alternating table-lands, ranges and peaks of the Sierra Madre Mountains. Here are lofty peaks and active volcanoes, including Popocatepetl, 17,876 ft., Orizaba, 18,250 ft., and Ixtaccihuatl, 16,960 ft. The central part of the continent contains practically no elevations, except those of the Ozark Hills in the south-central part of the United States. The Appalachian system extends from Newfoundland to the State of Alabama. It is so old that many of its lofty elevations have become lowlands through constant wearing away of the mountainous mass. The Allegheny Mountains, in Pennsylvania and Virginia, constitute the central part of the system. The northern group includes the Adirondacks of New York and the Green and White mountains of New Hampshire and Vermont. East of the elevation, where the land slopes gradually to the ocean, is the territory known as the Piedmont Region and the Atlantic Plain. See APPALACHIAN MOUNTAINS; ADIRONDACK MOUNTAINS.

Lowlands. The principal lowlands of North America are the Great Plains, stretching from the eastern base of the Rocky Mountains to the western slopes of the Appalachian system. They merge into the coastal plains of the Gulf of Mexico in the South. In Canada are the Laurentian Highlands, with their continuation, the Height of Land. In the Dakotas is an elevation known as the Black Hills, so-called because of the crowning, dark forests. These form practically the only break in the wide extent of the Great Central Plain. Minor stretches of lowlands are found along the coasts.

Rivers and Lakes. The eastern ranges of the Cordillera form the great continental divide. The river systems are the Arctic, the Atlantic, the Gulf, the Pacific and the inland. The Nelson, the Saskatchewan and the Mackenzie are the three great rivers constituting the Arctic system. The St. Lawrence is the principal river emptying into the Atlantic Ocean. Others are the Hudson, the Delaware and the Potomac. The Mississippi drains the Great Central Plain, and receives the water of the Missouri, Red, Ohio and Arkansas rivers. The Sacramento, Columbia, Fraser and the Copper rivers fall into the Pacific Ocean, and in the Arctic region the Yukon flows into Bering Sea. The Rocky Mountain plateau is drained by the Rio Grande and the Colorado, with its magnificent and marvelous canyons.

The lakes of North America are large and numerous. The St. Lawrence system, or Great Lakes, has an area of 90,000 sq. m. (See GREAT LAKES). In Canada are Great Bear, Great Slave, Athabaska, Reindeer, Winnipeg and Manitoba lakes and Lake of the Woods and many others of smaller area. Throughout the northern part of the United States are a great number of small lakes. Yellowstone Lake, in the western part, is of volcanic origin; among those which have no outlet are the Great Salt, Carson and Walker lakes.

GEOLOGY. The geologic history of the continent is fairly simple. The northeastern part, including the Laurentian Highlands of Canada and the Adirondack region of New York, was the first to be elevated above the sea. Within recent geologic times the Laurentian Glacier covered the greater portion of Canada and of the northeastern part of the United States. Vestiges of its action are apparent in the changed course of streams, erosion, deposits of moraine and the formation of numerous lake basins. Among the glaciers which still exist are several of wide extent on the coast of Alaska. The Muir Glacier covers at least 1000 sq. m. North America is rich in mineral deposits. In the east-

ern highlands extensive mining of coal and iron is carried on. Coal is also found in the territory between the Ohio and the Mississippi rivers, as well as in the Rocky Mountain region. Prior to the discovery of gold in South Africa and Australia, no other area yielded so rich a supply as that of the Rocky Mountains. Silver, lead and copper ores also exist. Gold has also been extensively mined along the Pacific coast. In the neighborhood of Lake Superior and northern Lake Michigan are deposits of copper and iron. Other extensive deposits of copper occur in Montana and Arizona. Other products are salt, marble, slate, granite, clay (used for brick), pottery and tile.

Climate. Latitude, relief, prevailing winds and rainfall determine the different climatic regions of North America and account for the wide divergences of temperature. In the extreme northern part only the surface of the ground thaws during the brief summer months, and vegetation is sparse. Northern Alaska and northern Canada are little more than lowland moors. Farther south the western coast grows rapidly milder, due to the ocean vapors and the checking of the polar winds by the Rocky Mountains, while far southward along the eastern coast Arctic climatic conditions prevail. British Columbia enjoys an equable and advantageous climate, while Labrador, in the same latitude, is unbearably cold and practically uninhabited. Through southern Canada and the United States the distinctive climatic features are prevailing westerly winds, which bring about equable climate and an abundance of rainfall on the western coast; and a continental climate between the principal mountain systems, which causes the temperature to shift from extremes of heat and cold, with alternating north and south winds. Central America, due to its narrowness, has an insular climate, and lies within the range of the trade winds. The Gulf region is sufficiently watered, except to the west, where arid territory is found. The Atlantic coast, though not enjoying the uniform climate of the Pacific, has abundant rainfall; the northern part is cold in winter.

Plant Life. In the North are numerous tundra, by reason of the constantly frozen ground; and reindeer moss, dwarfed willows and a few shrubs constitute the total plant life. Marked changes in the forests are apparent as one advances southward, forests of spruce, birch and alder yielding to pine, hemlock and fir, and to the heavily timbered areas of Washington, Oregon and California. In central and eastern United States the species changes to hard wood; in the southern part, chiefly to yellow pine. The plateau regions contain grass, cacti and yucca, but trees are practically unknown. The cactus is wild and picturesque, and furnishes food to cattle on the arid highlands. The prairie regions in the central part of the continent were practically treeless in their natural state, except along river banks, and their heavy growth of grass has yielded in part to plants that thrive under cultivation sometimes with the aid of irrigation. The eastern section has been wooded, and contains rich agricultural areas. In the South, vegetation becomes tropical, and there, as well as in Central America, plant life is profuse.

Animal Life. In part, the fauna of North America is identical with that of corresponding latitudes in the Eastern Hemisphere. Wild animals are still found in central regions. In the North the prevailing species are the polar bear, the fur seal, the walrus, the American reindeer, or caribou, the beaver, the otter and the Arctic fox. The moose and deer haunt the forests of latitudes as far south as northern Maine. The bison formerly so common on the central plains are now practically extinct. Gophers and prairie dogs still exist. The grizzly, black and brown bears, wolf, coati, Rocky Mountain sheep, elk and deer prowl among the Rocky Mountains; in the Appalachian region are found the possum, fox, raccoon, skunk, mink, wild cat, black bear and lynx. Animals peculiar to North America are

the musk ox, the skunk, the puma, the pronghorn and certain Rodents; those which are not native in its recent fauna are horses, cattle, sheep, camels, true antelopes and swine. The birds, reptiles and insects are not materially different from those of Europe; wild ducks and geese exist in the North; among large birds are the heron, wild turkey, crane, flamingo, gull, falcon, vulture and pelican. The rattlesnake, copperhead, certain kinds of watersnake and the Gila monster are the chief kinds of venomous reptiles. The alligator lives in the slime and water of the lagoons of the Gulf of Mexico. The fish are not distinctive, and resemble those of the colder parts of Europe.

INHABITANTS. At the time of the discovery of North America the country was sparsely populated by a barbarous, copper-colored race, to whom the Europeans gave the name of Indians. This people was not unskilled in the arts of carving shells, weaving and the making of pottery. In Mexico and Central America there still exist, though often covered by heavy forests, ruins of temples done in ambitious stone architecture; pueblos, or villages, are also found in the Southwest. The Eskimos, in the remote North, are stunted both in physical growth and material development because of the rigorous climate. The present inhabitants of North America represent a large proportion of the European nationalities. Among these, the English-speaking peoples are in the majority; a great number of French inhabit Canada, and a large proportion of the population of Central America is Spanish. The negroes, originally imported from Africa, dwell principally in the southern part of the United States.

POLITICAL DIVISIONS. The independent states of North America and adjoining islands are: the United States, including Alaska, Porto Rico and Hawaii; Mexico, Guatemala, Salvador, Nicaragua, Honduras, Costa Rica, Cuba, Haiti and Santo Domingo. The British possessions are Canada, Newfoundland, the Bermudas, the Bahamas, British Honduras, Barbados, Jamaica and several islands. The French possessions are St. Pierre, Miquelon, Guadeloupe and Martinique; the Dutch, Curaçao; the Danish, Greenland, Santa Cruz, St. Thomas and St. John.

HISTORY. The early, and not wholly authenticated, discovery of America was by way of Iceland. There are also stories current that storms and currents of the Pacific Ocean carried Japanese and Chinese vessels to the western coast of America. With the voyage of Christopher Columbus, in 1492, began the consecutive discovery and exploration of the American continent. North America was discovered by John Cabot in 1497; the new territory received its name after Americus Vespucius, who described it upon making a voyage of discovery. The Spanish, Portuguese, French and English early established colonies in the New World. The Spaniards settled in Florida and in what is now southern United States, as well as in Mexico. The French founded colonies in Louisiana and northward to Acadia (now Nova Scotia). The English established themselves principally along the middle Atlantic coast, the first settlement being made at Jamestown, Va., in 1607. By conquest, purchase and treaty the territory north of Mexico has gradually fallen into the possession of the Anglo-Saxon element of the population. During the latter part of the 18th century, the first of the great modern republics—the United States—was established, as a result of the separation of the colonies from the British Government. In 1759, through the defeat of the French at Quebec, the English Crown acquired the greater part of the St. Lawrence region. The Louisiana Purchase, in 1803, added the western basin of the Mississippi to the territory of the United States; in 1867 the further acquisition of Alaska (formerly Russian territory) was effected. Spain lost her control of Mexico and the Central American states in the early part of the 19th century. The United States has slowly gained possession of territory as far west as the Pacific Ocean, and

through the Spanish-American War, Porto Rico has been added as one of the possessions of the United States, while Cuba has gained her freedom from Spanish control. For the history of each division, see separate titles, subhead *History*.

Northamp'ton, Mass., a city and county seat of Hampshire Co., 17 m. n.w. of Springfield, 109 m. w. of Boston and about 140 m. from New York City, on the Connecticut River and on the Boston & Maine and the New York, New Haven & Hartford railroads. It is delightfully situated on a height which commands a fine view of the river valley. Within the corporate limits of Northampton are the villages of Florence, Leeds and Bay State, and it is much frequented as a summer resort. Mt. Holyoke and Mt. Tom, both having electric railways to their summits, are within the vicinity. Northampton has extensive commercial interests. The chief manufacturing establishments include basket and paper-box factories, hosiery mills, machine shops, emery-wheel, cutlery and hardware works and factories for the production of furniture, silver-plated ware and sewing silk.

Northampton has many prominent educational institutions, among the number being Smith College, one of the foremost colleges for women in the United States; the Clarke Institute for Deaf-Mutes; and the Burnham Classical School for girls. The Cooley Dickinson Hospital and Northampton Insane Asylum are located here. There are also the Home Culture Club, which gives instruction in household arts; Memorial Hall; and Academy of Music. The town was settled in 1654 by English colonists and named after Northampton, England. A city charter was granted in 1883. Population in 1920, U. S. Census, 21,951.

Northampton, Pa., a city of Northampton Co., 13 m. n.w. of Easton, the county seat, on the Central Road of New Jersey. Iron ore, zinc and slate, which have added materially to the development of the town in the last few years, abound in the vicinity. Northampton has manufactories of flour, shoes, cement, malt liquors, etc. Population in 1920, U. S. Census, 9,349.

North Anna River, Battle of, an engagement of the Civil War, fought in Virginia, May 23 and 25, 1864. When Grant, who was attempting to push on to Richmond, reached the North Anna with 127,000 men, he found Lee's 110,000 Confederates in a strong position on the opposite bank. Warren crossed the river, repulsing Hill's assault and taking 1000 prisoners, while Hancock cleared the Confederates from the Chesterfield bridge. However, when Burnside attempted to cross opposite Lee's center, May 25, he was driven back with fearful slaughter. Being completely blocked, the Federals made a detour to Hanover Courthouse, on the Pamunkey River.

North At'tleboro, Mass., a town of Bristol Co., 30 m. s.w. of Boston and 14 m. n.e. of Providence, R. I., on the New York, New Haven & Hartford Railroad. The villages of Adamsdale, Robinsonville, Oldtown and Falls Village are included within the corporate limits. The chief industries are connected with the manufacture and sale of jewelry, but there are manufactories of cotton yarn, buttons, rope, silverware, braid and jewelers' supplies. The Richards Memorial Library and the Holmes Memorial Building are located here. North Attleboro was settled in 1637 and incorporated in 1887. Population in 1920, 9,238.

North Bay, a town of Canada, in the Province of Ontario, situated on Lake Nipissing and on the Canadian Pacific and Grand Trunk railways, 146 m. n.w. of Pembroke. The general educational facilities are good and there are several fine churches, representing varying denominations. The hunting and fishing are excellent and the surrounding region is a favorite resort for sportsmen and tourists. The town is the gateway to the Cobalt silver region. Population in 1911, 7737.

North Brad'dock, Pa., a city of Allegheny Co., 10 m. s.e. of Pittsburgh and 2 m. e. of Homestead, on the Pennsylvania Railroad. A large plant of the United States Steel Corporation, en-

gaged chiefly in the manufacture of steel rails, is located here. The borough is a residential place and contains fine public buildings. It was incorporated in 1897 and organized from a part of Braddock Township. Population in 1920, 14,928.

Northbridge, *North' brij"*, **Mass.,** a town of Worcester Co., 11 m. s.e. of Worcester, on the Blackstone and Mumford rivers and on the New York, New Haven & Hartford Railroad. There are extensive manufactories of cotton and woolen goods, shirtings and cotton-mill machinery. It was settled as early as 1662, but was set off from Mendon and incorporated as a separate town in 1772. Population in 1920, 10,174.

North Cape, a promontory forming the most northerly point of Europe. It forms the northernmost part of the Island of Magero, which is separated from the coast of Norway by a narrow channel. It is a bare point of rocks about 1000 ft. in altitude.

North Car"oli'na, THE OLD NORTH STATE, one of the South Atlantic States, is bounded on the n. by Virginia, on the e. by the Atlantic Ocean, on the s. by the Atlantic Ocean, South Carolina and Georgia and on the w. by Tennessee.

SIZE. The greatest length from east to west is 503 m. The greatest breadth is 187 m. The average breadth is 100 m. and the area is 52,426 sq. m., of which 3686 sq. m. are water. North Carolina is a little larger than England, almost exactly the size of Alabama and the 27th state in area. Its surface is about one-thousandth part of the land area of the world.

POPULATION. In 1920 the population was 2,559,123. From 1910 to 1920 there was a gain in population of 352,836, or 16 per cent. There are 52.5 inhabitants to the square mile, and the state's rank in population is 14.

SURFACE. North Carolina is naturally divided into three surface areas: the Coastal Plain on the east, the Piedmont Section in the center and the Mountainous Region in the west.

The Coastal Plain. This extends inland from 100 to 150 m. and is low and level. The shore line is very irregular, giving the state over 300 m. of coast line. Projections along this coast form capes Hatteras, Lookout and Fear, and the outlying shoals are dangerous to navigation. In the eastern part of the state are the Currituck, Albermarle, Pamlico and other sounds, which are large bodies of salt water lying between the mainland and the "banks." The "banks" are a chain of low sandy islands extending from the northern border to Cape Lookout. In this eastern section there are many swamps and marshes. The most extensive of these is the great Dismal Swamp, the larger part of which is in Virginia. Along the western border the slope becomes more abrupt and some hills occur.

The Piedmont Section. This is about 200 m. wide and has an irregular eastern boundary, formerly the shore line of the ocean. Along this line are found the falls in the various rivers that flow into the Atlantic. For this reason the line is often called the Fall Line. The Piedmont Section begins with an elevation of about 200 ft. on its eastern boundary and gradually rises to meet the foothills of the mountains on its western boundary, where the elevation reaches about 1200 feet.

The Mountainous Region. The Blue Ridge Mountains, so-called from their color when seen from a distance, form the eastern margin of the third division of the state, the Mountainous Region. This section extends across the state, varying in width from 35 to 65 m., and has an area of about 6000 sq. m. Parallel to the Blue Ridge Range is the Great Smoky Range, whose summit forms the boundary between North Carolina and Tennessee, except at the extreme southwest corner of the state. Of its several chains, the chief are the Iron Mountains in the north and the Unaka Mountains in the south. Between the Blue Ridge and Great Smoky ranges are several cross chains, of which the highest are the Black Mountains, containing Mt. Mitchell, 6711 ft., the highest peak east of the Rockies. Next in importance of

the cross ranges are the Balsam Mountains, extending from South Carolina to the Great Smoky Mountains. The average elevation of the entire section is from 2000 to 5000 ft.

Rivers. The Chowan and the Roanoke flow into Albemarle Sound and drain the northeastern and north-central sections. South of the Roanoke and nearly parallel to it is the Tar, flowing into Pamlico Sound. South of this is the Neuse, draining the east-central part. The Cape Fear River, with its tributaries, drains the central and southeastern portions. The Yadkin and the Catawba, flowing into South Carolina, complete the drainage east of the Blue Ridge. The Hiwassee, the French Broad and Little Tennessee flow westward into the Tennessee River.

North Carolina has a number of lakes in the eastern section, the largest of which is Mattamuskeet, with an area of 100 sq. m. The other large lakes are Phelps, Alligator, Pungo and Waccamaw.

Scenery. The scenery in the western part of the state is particularly interesting and attractive. The intermingling of mountain, hill and valley lends to this region a variety of surface, combining beauty and grandeur. Wherever the rivers have crossed the mountains, especially the Unakas, they have formed deep, narrow gorges of great interest.

Climate. In range of latitude, North Carolina lies between the parallels which cross southern France and northern Algeria. In the east the heat of summer is modified by sea breezes and in the west by altitude. In the east the winters are mild and in the uplands of the interior they are not severe. Among the mountains the thermometer seldom falls to zero, and the mean annual temperature of the entire state is 59°. The climate of the upland and mountainous sections is so salubrious and bracing that these regions are considered as among the best health resorts in the country. Asheville and other towns are frequented by visitors throughout the year, those from the North coming in both summer and winter, and those from the South in summer.

Minerals and Mining. In the northeast section of the mountainous region are valuable mica mines from which a large part of the mica of the country is obtained. North Carolina is also the leading state in the production of monazite. The mining of corundum is also an important industry. Gold is quite generally distributed over the upland regions, and previous to the discovery of gold in California, North Carolina was the leading state in the production of this metal, though it is not now extensively mined. Coal is found in Chatham and Moore and in Stokes and Rockingham counties. An excellent quality of iron ore occurs in the mountain sections. Granite, marble, porphyry, gneiss and other building stone occur in large quantities. In the eastern part of the state there are extensive deposits of clay. Near Wilmington are valuable deposits of phosphate rock, and throughout the mountain section precious stones, including emeralds, rubies, garnets, amethysts, opals and hiddenite, are found.

Forests and Lumber. North Carolina possesses extensive forests of hard woods, pine, cypress and spruce. The yellow, or long-leaf, pine is widely distributed through the forests of the state. Many sawmills have been established and lumbering is the second manufacturing industry. Large quantities of rosin, tar and turpentine are also obtained from the pine forests of the Central Plain.

Agriculture. Agriculture is the chief industry, and, owing to a wide range of soil and climate, a great variety of crops is raised.

Soil. In the eastern part of the state the soil is somewhat sandy. Along the rivers it is a clay loam and very fertile. The swamps contain a deep, fertile soil that produces abundant crops where these regions are properly drained. In the central part of the state the soil is a clay loam with some sand and gravel.

Products. Nearly all the agricultural products found in the United States

are raised in North Carolina. The most important crops are corn, cotton and tobacco. North Carolina ranks next to Kentucky in the production of tobacco. Cotton is grown in the uplands of the eastern part of the state and in the south-central part. The annual yield is about 1,000,000 bales. Corn is raised throughout the state and some rice is grown on the lowlands along the coast. Large quantities of sweet potatoes are raised, North Carolina ranking first in the production of this crop. Trucking is an important industry in the east, and grapes and other fruit are grown in the upland regions.

FISHERIES. Shad and herring fisheries are of great value. In taking these fish, large nets from one to three miles in length are used. They are operated by steam power. Striped bass, menhaden and other fish are taken in large quantities. Excellent oysters are taken from the sounds, and clams, terrapin and turtles abound in the coast waters. The combined fishing industries give employment to about 10,000 men.

MANUFACTURES. The state possesses almost unlimited water power, and excellent factory sites are found along the Fall Line, and in many other places. The manufacture of cotton goods is the chief factory industry and one that is constantly growing. The factories use more cotton than is raised within the state and consume some sent in from other states. This industry gives employment to over 50,000 people. The manufacture of tobacco products ranks second in importance and furnishes employment to over 40,000 people. Following these in the order of importance are the manufacture of lumber and lime products, of rosin and turpentine, of cottonseed oil and cake, of flour and gristmill products and of fertilizers. Tanning and curing leather is also an important industry.

TRANSPORTATION AND COMMERCE. Some of the rivers flowing into the Atlantic are navigable to the Fall Line about 100 m. from the coast, and Wilmington and Fayetteville have direct communication with the sea. The Atlantic Coast Line, the Seaboard Air Line, the Southern Railway and other railways traverse the state in various directions, the combined mileage of these lines and their feeders exceeding 3600. Excepting some localities in the mountain section, all parts of the state are well provided with transportation facilities. Raleigh, Wilmington, Greensboro and Charlotte are important railway centers.

GOVERNMENT. The present constitution was adopted in 1868 and has been amended several times. The executive department consists of the governor, lieutenant-governor, secretary of state, attorney-general, treasurer, auditor, superintendent of public instruction, commissioners of agriculture, of insurance and of labor, all elected by the people for four years. The governor cannot succeed himself. The Legislature consists of a Senate of 50 members and a House of Representatives of 120 members, elected by the people for two years.

The judiciary department comprises a Superior Court consisting of one chief justice and four associate justices chosen by the people for eight years, and 20 Superior Court justices elected by the people. The Supreme Court justices hold court in the 20 judicial districts into which the state is divided. Local courts are established in several towns and counties.

EDUCATION. The school system is under the supervision of a state superintendent of public instruction. Separate schools are maintained for white and colored children. In the last few years public schools have made rapid advancement. In cities and towns the schools are well graded and high schools are maintained. There is a state normal school and industrial college for white women at Greensboro, and appropriations are made for yearly normal institutes in each county. The University of North Carolina at Chapel Hill is the second oldest state university. There is an agricultural college for the white people at Raleigh and a similar one for the colored race at Greensboro, and there are

several schools in the state for training colored teachers.

The higher institutions not under control of the state are Davidson College at Davidson; Trinity College at Durham; Guilford College at Guilford; Wake Forest College at Wake Forest; and Southern Presbyterian College at Red Springs. The leading denominational institutions for colored students are Shaw University at Raleigh; Livingstone College at Salisbury; and Biddle University at Charlotte.

State Institutions. Hospitals for the insane whites are maintained at Raleigh and Morganton. There is also one at Goldsboro for colored patients. There is a school for the colored deaf, dumb and blind and also one for the blind white children at Raleigh, and a similar institution for white deaf-mute children at Morganton. The Confederate soldiers' home is at Raleigh, and there is an orphan asylum for whites at Oxford.

Cities. The chief cities are Raleigh, the capital; Charlotte, Wilmington, Winston-Salem, Asheville, Durham and Greensboro.

History. North Carolina, named after Charles I of England, was explored by the Raleigh expedition late in the 16th century, the first colony settling in Roanoke Island in 1585. The first permanent settlement, however, was made about 1653 by Virginians. In 1663 Charles II granted it to eight lords-proprietors, who ruled so liberally that immigrants from Bermuda, Barbados and New England came to Albemarle, as the province was called. In 1670 an unsuccessful attempt was made to establish John Locke's *Fundamental Constitution*. In 1718, having been bought out by the Crown, North Carolina became a royal province. It was one of the first to advise the Declaration of Independence and to adopt an independent constitution; the state was the scene of many important transactions in the Revolution. It ratified the Constitution in November, 1789. North Carolina did not secede till Lincoln called for troops. It then sent double its quota to the South, giving and losing more men than any other Confederate state. The state opposed the plan for reconstruction, but was readmitted to the Union in July, 1868. The state is progressing rapidly along educational and industrial lines. Consult Moore's *History of North Carolina;* and the pamphlets issued by the State Historical Commission.

Governors. Richard Caswell, 1777-1779; Abner Nash, 1779-1781; Thomas Burke, 1781-1782; Alexander Martin, 1782-1784; Richard Caswell, 1784-1787; Samuel Johnston, 1787-1789; Alexander Martin, 1789-1792; Richard Dobbs Spaight, Sr., 1791-1795; Samuel Ashe, 1795-1798; William Richardson Davie, 1798-1799; Benjamin Williams, 1799-1802; James Turner, 1802-1805; Nathaniel Alexander, 1805-1807; Benjamin Williams, 1807-1808; David Stone, 1808-1810; Benjamin Smith, 1810-1811; William Hawkins, 1811-1814; William Miller, 1814-1817; John Branch, 1817-1820; Jesse Franklin, 1820-1821; Gabriel Holmes, 1821-1824; Hutchings G. Burton, 1824-1827; James Iredell, 1827-1828; John Owen, 1828-1830; Montford Stokes, 1830-1832; David Lowry Swain, 1832-1835; Richard Dobbs Spaight, Jr., 1835-1837; Edward Bishop Dudley, 1837-1841; John Motley Morehead, 1841-1845; William Alexander Graham, 1845-1849; Charles Manly, 1849-1851; David Settle Reid, 1851-1854; Warren Winslow, 1854-1855; Thomas Bragg, 1855-1859; John Willis Ellis, 1859-1861; Henry Toole Clark, 1861-1862; Zebulon Baird Vance, 1862-1865; William Woods Holden, 1865; Jonathan Worth, 1865-1867; Gen. Daniel Edgar Sickles, 1867; Gen. Ed. Richard Sprigg Canby, 1867-1868; William Woods Holden, 1868-1870; Tod R. Caldwell, 1870-1874; Curtis Hooks Brogden, 1874-1877; Zebulon Baird Vance, 1877-1879; Thomas Jordan Jarvis, 1879-1885; Alfred Moore Scales, 1885-1889; Daniel Gould Fowle, 1889-1891; Thomas Michael Holt, 1891-1893; Elias Carr, 1893-1897; Daniel Lindsay Russell, 1897-1901; Charles Brantley Aycock, 1901-1905; Robert

Brodnax Glenn, 1905-1909; William Walton Kitchin, 1909-1913; Locke Craig, 1913-1917; Thomas W. Bickett, 1917-1921; C. Morrison, 1921—.

North Carolina, University of (1789), at Chapel Hill. This institution was opened to students in 1795. It comprises schools of law, medicine, pharmacy, engineering, a college and a graduate department. Women are admitted to the higher courses, and there is a fund for aiding students who need assistance. Free instruction is offered to graduates of colleges and universities, to young men preparing for the ministry or for teaching and to teachers. The library contains over 60,000 volumes and the enrollment is about 800.

North Dako'ta, THE FLICKERTAIL STATE, one of the West North Central States, is bounded on the n. by the Dominion of Canada, on the e. by Minnesota, from which it is separated by the Red River of the North, on the s. by South Dakota and on the w. by Montana.

SIZE. The length from north to south is 210 m. and the breadth is 360 m. The area is 70,837 sq. m., of which 654 sq. m. are water. The state is a little smaller than South Dakota or Nebraska, a little larger than Maine and Indiana combined and the 16th state in area.

POPULATION. In 1920 the population was 646,872. From 1910 to 1920 there was a gain in population of 69,816, or 12.1 per cent. There are 9.2 inhabitants to the square mile and the state's rank in population is 36.

SURFACE. The surface of North Dakota consists of three distinct regions. In the east is the Valley of the Red River of the North, a level plain, on the North Dakota side from 20 to 50 m. wide, and varying in altitude from 965 ft. at Wahpeton to 836 ft. at the northern boundary. West of this plain is a region of rolling prairie which is separated from the valley by an abrupt slope that gradually rises westward from a height of about 40 ft. to one ranging from 200 ft. to 300 ft. The Pembina Mountains, a range of low hills near the Canadian boundary, form a part of this slope, and the Turtle Mountains, an uplift from 300 to 400 ft. high, also along the Canadian boundary nearly midway between its eastern and western extremities, belong to this region. The ridge separating the Valley of the Red River from the plain to the west gradually descends as it extends southward, until at Walsh County it blends with the surrounding country. The prairie region gradually rises until on its western border it meets the Coteau du Missouri, a ridge from 300 to 400 ft. high and from 20 to 50 m. wide. To the west of this ridge lies the third surface region, which embraces the highest plain of the state and occupies nearly one-half of its area. East of the Missouri River this region has a billowy appearance and this continues in some places west of the river. Along the streams are deep ravines. The hillsides have been eroded by wind and water and many of them have taken on fantastic forms whose beauty is enhanced by the variety of colors in the rock. Much of this region is good grazing land.

RIVERS AND LAKES. The eastern part of the state is drained by the Red River of the North into Hudson Bay. The Sheyenne, the Park and the Pembina are its most important tributaries. The Souris, or Mouse, River crosses the Canadian boundary three times and drains the north-central part into the Assiniboine and thence into Hudson Bay. The Missouri and its tributaries drain that part of the state west of the Coteau du Missouri. The Missouri is the most important stream in the state. Its chief tributaries from the north are the Muddy, the White Earth, the Shell, Paintedwoods Creek, the Apple and the Big Beaver. From the south and west are the Little Missouri, the Knife, the Big Heart and the Cannon Ball. The tributaries from the south and west are much larger and longer than those from the north and east. The James, flowing into South Dakota, drains the central part of the state.

North Dakota has but few lakes. Devils Lake between Ramsey and Ben-

son counties is the largest. This is a beautiful sheet of water surrounded by wooded shores, and is a favorite summer resort. Other lakes of importance are Stump Lake in Nelson County and Bush Lake in Cavalier County.

CLIMATE. North Dakota has a cool temperate and equable climate. The winters are long and cold but the atmosphere is clear, dry and bracing, so that the cold here is not felt so much as in many places having a higher winter temperature but greater humidity. The summers are cool and delightful. There are occasional hot days but the nights are cool. The mean annual temperature is 39.4°. The annual rainfall in the Valley of the Red River is about 24 inches, but in the western part of the state it is much less. The eastern part of the state has sufficient rainfall for agricultural purposes by ordinary methods of tillage and in the western part dry-farming is successfully carried on. See DRY-FARMING.

MINERALS AND MINING. That part of the state southwest of the Missouri River contains extensive deposits of lignite coal, the fields practically covering the entire region. Coal fields are also generally distributed over that part of the state west of the 100th meridian, though they are less extensive than those in the first field. The coal outcrops in many places and farmers frequently obtain their fuel by digging it from these veins. In the southwestern part of the state are a number of coal mines in operation and about 300,000 tons of coal are mined each year. Good clay for making brick is found in many localities, and building stone occurs in the Turtle Mountains.

AGRICULTURE. North Dakota is preeminently an agricultural state and has under tillage the largest farms in the United States, some of them containing 30,000 acres under a single management. Modern farm implements and machinery, including steam thrashers and steam plows, are used and scientific methods are employed, all of which bring about very good results.

Soil. In the Valley of the Red River of the North the soil is rich alluvium of great depth. In the prairie region clay and sandy loams are found. In general the soils contain an abundance of plant food and produce excellent crops.

Products. Wheat is the leading crop and North Dakota is one of the foremost states in raising No. 1 Hard spring wheat, the crop some years amounting to 100,000,000 bushels, with an average of over 90,000,000 bushels. The other products in the order of value are flaxseed, oats, barley, corn, hay and potatoes. Garden vegetables and small fruits flourish and crab apples and the hardier varieties of other apples are also grown.

The western part of the state is well suited to grazing, and large numbers of horses, cattle and sheep are raised in this region. The annual wool clip exceeds 300,000,000 lb. Dairying is common through the state and is a thriving and growing industry.

MANUFACTURES. The production of flour is the leading manufacturing industry and is quite equally distributed over the wheat-growing part of the state. Making brick and pottery is the next industry of importance. Other manufactures local in their nature, that is, designed to supply neighborhood demands, are necessarily of limited extent. Fargo and Grand Forks are the chief manufacturing centers.

TRANSPORTATION AND COMMERCE. The Red River of the North is navigable at high water, but since the construction of railways it is but litttle used. The Great Northern, the Northern Pacific, the Soo and the Chicago, Milwaukee & St. Paul railway systems have numerous lines in the state. Most of the lines, however, are under control of the Great Northern and Northern Pacific railway systems. The trunk lines extend east and west, and numerous cross lines connect these at numerous points. The counties in the eastern part of the state and those in the western part crossed by trunk lines have good railway facilities, but railway construction has not yet reached all the counties in the

southern and western sections. Fargo and Grand Forks are the chief railway centers.

Wheat, flour, live stock, dairy products and agricultural products are exported, and manufactured goods and some foodstuffs are imported. There are no great commercial centers and the trade is quite equally distributed over the state. This even distribution of commercial and other industries contributes to the general welfare of the people, and North Dakota is said to be the "state without a millionaire and without a pauper."

GOVERNMENT. The constitution was adopted in 1889. It contains a clause prohibiting anyone from interfering with another's obtaining employment or interfering with the enjoying such employment after it is obtained. It also contained a clause prohibiting liquor traffic. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general, commissioner of insurance, commissioner of agriculture and labor, superintendent of public instruction and three railroad commissioners, each elected for two years. The Legislature consists of a Senate of not less than 30 nor more than 50 members, and a House of Representatives of not less than 60 nor more than 140 members. Senators are elected for four years and representatives for two years. Sessions are held biennially and are limited to 60 days.

The judicial department consists of a Supreme Court of five judges elected for six years, and 12 District Courts presided over by a judge for each district, elected for four years. There are local courts in counties and cities.

EDUCATION. North Dakota has a large educational fund derived from public school lands. The state has also made large appropriations of land for state institutions. Public schools are under the general supervision of a superintendent of public instruction and the schools of each county are under the supervision of a county superintendent. There is a board of education consisting of the superintendent of public instruction, the president of the state university, the president of the agricultural college and two additional members appointed by the governor, which has charge of the high schools. State normal schools are maintained at Mayville and Valley City, and another has been recently located at Minot. There is an industrial normal school at Ellendale, a school of forestry at Bottineau and a scientific school at Wahpeton. The state agricultural college is at Fargo and there are substations at Dickinson, Edgeley, Williston, Langdon, and Hettinger. There are also 24 demonstration farms located in different parts of the state. The state university at Grand Forks is at the head of the education system. Fargo College at Fargo is under the auspices of the Congregational Church.

STATE INSTITUTIONS. The asylum for the insane is at Jamestown, the school for the blind is at Bathgate, that for the deaf and dumb is at Devils Lake and the institute for the feeble-minded is at Grafton. There is a soldiers' home at Lisbon. The state penitentiary is at Bismarck and the state reform school at Mandan.

CITIES. The chief cities are Bismarck, the capital; Fargo, Grand Forks, Valley City, Minot, Devils Lake, Jamestown and Mandan.

HISTORY. North Dakota (*Dakota* is the Sioux word meaning allied) was part of the territory bought from Napoleon in 1803 (See LOUISIANA PURCHASE). The first permanent settlement was made by French traders at Pembina in 1870. Because of a mistaken idea as to the location of the Canadian line, Lord Selkirk's colony dwelt here from 1812 to 1823. In 1861 Dakota Territory was organized. By 1875 it had less than 1000 white settlers. Until 1883 Yankton was the capital, when the seat of government was removed to Bismarck. In November, 1889, being separated from South Dakota, North Dakota became a state. Of late years its great agricultural resources have given it exceptional prosperity.

GOVERNORS. John Miller, 1889-1891; Andrew H. Burke, 1891-1893; Eli C. D. Shortridge, 1893-1895; Roger Allin, 1895-1897; Frank A. Briggs, 1897-1898; Joseph M. Devine, 1898-1899; Frederick B. Fancher, 1899-1901; Frank White, 1901-1905; Elmore Y. Sarles, 1905-1907; John Burke, 1907-1913; Louis B. Hanna, 1913-1917; L. J. Frazier, 1917—. Few governors have served two terms.

North Dakota, University of, at Grand Forks (1883). By act of Congress 126,080 acres of land, none of which could be sold for less than $10 per acre, were granted for the support of this institution. The university receives from the state a regular appropriation in lieu of two-fifths of a mill tax. It maintains a school of education, and colleges of arts, law, medicine and engineering. It reports a library of about 60,000 volumes and assets amounting to $2,500,000. The enrollment is about 1200.

Northern Nigeria, *Ni je' ri a,* a protectorate of British West Africa, lying between Dahomey and Kamerun and extending from the Gulf of Guinea almost to the 15th parallel north. It covers an area of 256,400 sq. m., inhabited by various African tribes. These natives carry on by barter an extensive trade in forest products, fruits, rubber, kola nuts, ivory, cotton, tobacco, capsicum and peanuts. Iron, tin and potash are mined and cattle and horse raising are practiced in the north. The government is administered by a commissioner, whose residence is at Zungeru. The population is 9,269,000, less than 600 of whom are Europeans.

Northers, or **Northwesters,** a local name applied in certain parts of the United States to the steady cold north and northwest winds, or winds accompanied by rain or snow. These winds are anticyclonic in character, that is to say, caused by the downward rush of a volume of cold air from higher to lower altitudes. They take their rise in the plains of western Canada, whence they sweep outward over southern and eastern United States. See COLD WAVE.

Northrop, *North' rup,* **Cyrus,** (1834-), an American educator, born at Ridgefield, Conn. He graduated at Yale in 1857, and two years later from its law school. He was admitted to the Connecticut bar, served as clerk of the Connecticut House of Representatives, and in 1862 as clerk of the Senate. He was professor of rhetoric and English literature at Yale from 1863 to 1884, meantime serving as editor of the New Haven *Palladium,* and from 1869 to 1881 as collector of the port of New Haven. In 1884 he was elected president of the University of Minnesota, where he served with distinction until his resignation in 1911.

North Sea, or **German Ocean,** a part of the Atlantic Ocean, lying between Europe and the eastern coast of Great Britain. Through the Strait of Dover and the English Channel it communicates with the Atlantic Ocean, and through the Skagerrak, the Cattegat, the Sound and the Great and Little belts, with the Baltic Sea. It is 680 m. long and has a greatest width of 412 m. Its area is about 200,000 sq. m. Along the rocky Norwegian shore the depth increases to about 1000 ft., the average depth being from 100 to 200 ft. Navigation on its waters is extremely dangerous, due to the violent northwest storms and the constant heavy fogs. The fisheries of cod, herring, haddock, ling and flatfish are very valuable.

North Ton"awan'da, N. Y., a city of Niagara Co., 10 m. n. of Buffalo, on the Niagara River, at the mouth of the Tonawanda Creek, which separates the city from Tonawanda, on the Erie Canal and on the Erie, the West Shore, the Wabash, the Lehigh Valley and the New York Central & Hudson River railroads. It has a good harbor and is an important industrial and commercial center known especially for its lumber and iron interests. The city has a large production of pig iron, structural steel, concrete building blocks, gas motors, steam merry-go-rounds, radiators and miniature railroads. Population in 1920, U. S. Census, 15,482.

Northwestern University, at Evanston and Chicago, Ill. (1851). This is a coeducational institution under the auspices of the Methodist Episcopal Church. The schools of law, medicine, pharmacy, dentistry and commerce, which take high rank, are in Chicago; while on a beautiful site at Evanston, adjacent to Chicago on the shore of Lake Michigan, there are the college of liberal arts, the school of music and oratory, the school of engineering, Garrett Biblical Institute and the Danish-Norwegian and Swedish Methodist schools, all of which maintain close relations with the university. Preparatory schools are maintained at Evanston, Elgin and Onarga. The library at Evanston contains approximately 175,000 volumes. The university endowment amounts to upwards of $5,000,000, and in all departments there are enrolled about 5000 students.

Northwest Mounted Police, a special police of Canada, organized by Sir John A. MacDonald in 1873 and having for their special duty the preservation of law and order on the northwest frontier. The force is under the direction of the Dominion Government and may include 1000 officers and men, but ordinarily the number is from 700 to 900. When the force was organized, the northwestern territory was divided into eight divisions, and these were subdivided into 100 stations. The force is under the general direction of a commissioner and an assistant commissioner, and each division is under the supervision of a superintendent. The term of enlistment is for five years, and the men who serve a full term are entitled to a pension.

From the beginning the organization and discipline were of the highest order, and for nearly 40 years the Mounted Police maintained order, prevented crime and safeguarded the rights of persons and property over the vast territory of the Canadian Northwest. It was through their efforts that the early settlers were kept from the dangers and annoyances so frequently besetting the pioneer. They have attained the reputation of being one of the most efficient police forces in the world.

Northwest Territory, in American history that portion of the national domain lying west of Pennsylvania and north of the Ohio River as far as Canada and west to the Mississippi River, which was organized as a United States territory in 1787. The larger part of this territory was claimed by Virginia, Massachusetts, New York and Connecticut by reason of their charter and other grants. Its cession to the general government was brought about by Maryland's refusing to sign the Articles of Confederation unless all the states would cede their rights to the government. Congress, therefore, promised in 1780 that the territory, when ceded to the United States, should be formed into new states on an equal footing with all the others, and the various states ceded their claims. Certain lands, however, were reserved from the cession for special purposes. In 1784 a temporary form of government was drawn up for this territory which provided that out of the territory there should be created 17 states, but this ordinance was succeeded later by the Ordinance of 1787, under which the territory was governed from 1788 to 1802. From it were created the states of Indiana, Ohio, Illinois, Michigan, Wisconsin, and a part of Minnesota. See ORDINANCE OF 1787.

North West Territories, that section of Canada reaching from the territory of Yukon on the west to Hudson Bay and its connecting waters. Its northern boundaries are the many arms of the Arctic Ocean, which separate the numerous islands from the mainland, and its southern are the provinces of British Columbia, Alberta, Saskatchewan and Manitoba. In the recent reorganization of Canada, North West Territories was made from the old territory of Mackenzie and the northern portion of Keewatin. Its area is 1,871,100 sq. m.

The northern part of this great territory is beyond the region of forests and is known as the Barren Lands. Upon it grow moss and lichens, the food of the

deer and the caribou. Farther south are the great forests of larch, black spruce and white spruce. Physically the country is chiefly a level plain set with numerous lakes, the largest of which are great Bear Lake and Great Slave Lake, and intersected by several rivers (See MACKENZIE RIVER). The Height of Land, which originates in Alberta near the eastern slopes of the Rocky Mountains and passes through northern Saskatchewan, also crosses North West Territories, making a great curve to the west and then extending northeast to Melville Peninsula. It separates the Mackenzie River basin from the rivers flowing into Hudson Bay.

The most valuable resources are the furs, and the only settlements are the trading posts of the Hudson's Bay Company. The forests will sometime be of greater importance than now, and unexplored regions may later yield minerals. The territory is ruled from the central government at Ottawa, which appoints the local officials. Population in 1911, 17,196.

North Yak'ima, Wash., the county seat and chief city of Yakima Co., situated on the Yakima River and the Northern Pacific Railway, about 200 m. s.w. of Spokane. It is in the heart of a large irrigated district and is the most important commercial center of the Yakima Valley. The manufactories include flour and lumber mills, fruit canneries and woodworking factories. There is an extensive trade in farm products and merchandise, and a number of large warehouses are located here. The city has paved streets, excellent business blocks, schools and churches. The Washington State Fair, which occurs annually, is held here. Population in 1920, 18,539. (Now known as Yakima.)

Nor'ton, Charles Eliot (1827-1908), an American scholar and author, born at Cambridge, Mass. He graduated at Harvard University in 1846, engaged in the India trade in connection with a business house in Boston for a short time, and in 1849 went to India and to Europe, and gradually turned all his attention to literature. From 1864 to 1868 he was editor of the *North American Review,* and in 1875 was made professor of the history of art at Harvard University, becoming professor emeritus in 1898. The finer ideals of culture were his, and his work embodies some of the loftiest aspirations for the good of his countrymen that Americans have ever held. His literary work connects closely with Italy—the country and its history. Among his writings are *The New Life of Dante, The Divine Comedy of Dante* (a prose translation), *Considerations on Some Recent Social Theories, Notes of Travel and Study in Italy, Historical Study of Church-Building in the Middle Ages* and *The Poet Gray as a Naturalist.* He was the literary executor and editor of Lowell, Carlyle, Emerson, G. W. Curtis and Ruskin.

Norwalk, *Nor' wok,* **Conn.,** a city and summer resort of Fairfield Co., 30 m. n.e. of New York City and 12 m. s.w. of Bridgeport, on the Norwalk River near Long Island Sound and on the New York, New Haven & Hartford Railroad. Steamers ply between Norwalk and New York. The city is situated in an agricultural region and the shipping of farm products is an important industry. There is also considerable coastwise trade, as well as large oyster interests. There are manufactories of corsets, hats, shirts, cassimeres, worsted goods, silks, shoes, locks, air compressors, general hardware, felt and straw goods and launches. A state armory, the Fairfield County Children's Home and the Norwalk Hospital are located here. South Norwalk is two miles south of Norwalk. It has large industrial works, which comprise manufactories of machinery, boots and shoes, locks and air and gas compressors. Norwalk was settled in 1649, incorporated as a borough in 1836 and received a city charter in 1893. In 1779 it was burned by a British force under generals Tryon and Garth. Population in 1920, 27,743.

Norwalk, Ohio, a city and county seat of Huron Co., 16 m. s.e. of Sandusky and 55 m. s.w. of Cleveland, 10 m.

s. of Lake Erie and on the Lake Shore & Michigan Southern and the Wheeling & Lake Erie railroads. It is situated in a productive agricultural region and is noted as a commercial center for a large adjacent section. It is connected with the near-by towns and cities by interurban electric lines. Norwalk's industrial interests are represented by iron and steel works, machine shops, piano and organ works, railroad shops, pyrography works, canneries, pickling works and a large printing and publishing house. There are also manufactories of wood specialties, umbrellas, curtain poles, tobacco, boots and shoes and novelties. The city has a large trade in farm and dairy products, fruit and live stock. There are many handsome residences and well-built business blocks. Norwalk was settled in 1816, incorporated in 1828 and chartered as a city in 1840. Population in 1920, 7,379.

Nor'way, a kingdom of northern Europe, constituting with Sweden the Scandinavian Peninsula. It extends from 57° 58′ to 71° 11′ north latitude. Its northern coast is washed by the Arctic Ocean; the eastern boundary borders the Russian Government of Archangel for 50 m., Finland for nearly 500 m. and Sweden for 950 m.; on the south is the Skagerrak, connecting the North Sea with the Cattegat and separating Norway from Jutland. The total area is estimated at 124,495 sq. m., or a little more than that of New Mexico. The coast line is generally broken by fiords and islands, and measures approximately 12,000 m. in length.

Surface, Rivers and Lakes. The country as a whole is a rugged plateau, and the ancient mountains along the western coast have been worn down only as a result of long periods of inundation, while the numerous fiords and islands bear witness to the former existence of glaciers. The principal mountain system of the peninsula is known as the Kjölen; in the extreme west of Norway are two other mountain ranges, the Langfjeld and the Dovrefjeld. The loftiest mountain peaks are Jæggevarre (6283 ft.), Kiste Fjeld (5653 ft.) and Snehætta (7615 ft.), the last mentioned adjacent to the Rauma Valley in the south-central part and famous among tourists for its great beauty. Many of the rivers are fairly large, and, after flowing parallel for long distances, unite as they empty into the sea. Among the principal streams are the Glommen (with a basin of 16,000 sq. m.), the Drammen (6600 sq. m.) and the Skien (4250 sq. m.). Very few are navigable, due to the frequent rapids, which add great charm and beauty to the landscape. Lakes dot highlands and woodlands; the largest lie in the deep valleys.

Climate. The warm Atlantic drift, to which the whole western coast is exposed, moderates the climate, and the mean temperature of this region is about 45° F. As a result of the drift, the fiords are practically ice-free, except during extremely severe winters. About 300 m. of the territory lie within the Arctic zone, and a third of the country belongs to the domain of continuous winter darkness and the midnight sun. Even in the southern part of Norway there is no darkness between the end of April and the middle of August; in winter the northern part enjoys only a twilight at midday. Where the land rises to lofty heights, perpetual snows cover the summits, and glaciers descend into the intervening valleys.

Mining and Forestry. The mountains do not yield a rich supply of mineral ores. Silver has constituted the chief product, though iron and copper ores, pyrites and coal are also found. Millstones, soapstone, slate, marble and other building stones more than supply local demand and furnish a large part of the exports. One of the main industries of the country is lumbering; the largest forests are remote from the centers of population, and the conditions have developed a strong and hardy type of timber cutters and log drivers that make their home in the forests during a large part of the year. Pines and spruces represent the chief varieties of trees, and their rapid disappearance around Chris-

tiania points to the devastation constantly attendant upon inefficient methods of conservation. Wood products constitute about one-third of Norwegian exports.

Agriculture and Fisheries. Bare mountainsides comprise 59 per cent of the total country; only 10 per cent is in pasture land and tilled soil, the remaining 22 per cent, forests. Oats, barley, wheat and rye are important products, but no cereal growth is sufficient to supply native demand; potatoes are extensively grown. Much of the prosperous yield of an otherwise slightly fertile soil is due to proper methods of cultivation. The fisheries represent the oldest industry of the country. The value of that part of the catch which is used only for exportation purposes has averaged, during the last 31 years, over $5,000,000 annually. The cod is the largest fishery, and the Lofoten Islands are the center of the catch. Next in importance are the herring and the mackerel. Salmon, lobsters, oysters and sea trout are also obtained. The Arctic Sea is extensively navigated for fishing purposes, and a fairly rich yield in sealskins, oils, whale oil and bearskins is the result.

Manufactures. The lumber industry occupies a large per cent of the population, and numerous saw and planing mills are found along the rivers. At Christiania are large machine shops and carriage and car works, and iron ships are constructed. The large resources of wood pulp make the manufacture of paper significant. Tanneries, tinning works, potteries, china factories, tobacco works, iron foundries, nail-rolling and wire mills are also found. The imports of manufactures are large, due to the fact that the country still remains backward in industrial development.

Transportation and Commerce. The Norwegians are preeminently a race of sailors, and their merchant marine is the largest in the world in proportion to the population, or the fourth largest, in actual comparison. The national commerce is small, but the Norwegian vessels are frequently used as ships of carriage for foreign trade. The railway mileage is largely in the possession of the state, and that portion of it which the government controls now approximates 2000. In commerce, the imports exceed the exports, but the deficiency is made up by the profits accruing from the foreign shipping trade. The imports consist principally of the cereals, rye, barley, wheat; also sugar, coffee, meat, textiles and raw materials (including coal, hides, skins, cotton, wool and hemp). Locomotives, vessels and metal goods are also imported. The exports comprise butter, condensed milk, packing paper, ice, iron and steel nails, metal, ores and salted and dried fish.

Inhabitants. The Norwegians are almost all of Scandinavian origin. There are a few Lapps and Finns, but they constitute only a small per cent of the population. The Norwegians possess strong national characteristics, which persist and make them a highly individual people, as is apparent particularly in their modern music, literature and painting. They preserve many ancient local customs and social practices. Emigration, particularly to the United States, is heavy, but recent years have shown a perceptible decrease, due to the fact that the population is moving instead from the rural districts to the towns. The people as a whole are hardy, and have shown marked preference for the physical sports which require great bodily endurance, and for explorations and navigation on the high seas.

Government and Religion. The government of Norway is a constitutional monarchy, and has been independent of any connection with Sweden since the dissolving of the union between the two countries on June 7, 1905 (See subhead *History*, in this article; also Sweden, subhead *History*). The executive power is vested in a king, and he exercises his authority through a Council of State, consisting of a minister and councilors appointed by him. The Parliament, or Storthing, is the legislative body, and its members take their seats through direct vote of the people. This Storthing divides itself into the two

chambers, the Lagthing, or upper house, and the Odelsthing, or lower house. Bills originate in the Odelsthing; they are then passed to the upper house and become law upon receiving the royal sanction. The State religion is Evangelical Lutheran; all Christian sects, except Jesuits, are tolerated.

EDUCATION. See EDUCATION, NATIONAL SYSTEMS OF.

LITERATURE. See LITERATURE, subhead *Scandinavian Literature.*

CHIEF CITIES. The principal cities are Christiania, the capital; Bergen, Drammen, Trondhjem and Stavanger.

HISTORY. In the early period of its history, Norway consisted of various petty tribal kingdoms. These were united under Harald Haarfagr (about 930). A century later Christianity had become established, and in the 13th century written Norse literature and law began. The death of Haakon V, in 1319, without male heirs, caused the National Assembly to elect Magnus of Sweden king. He was succeeded by his son, Haakon VI. Olaf, son of Haakon VI, and King of Denmark, became ruler of both kingdoms in 1380, and he died without heirs in 1387. Thereupon his mother, Margaret of Denmark, succeeded to both thrones, and in 1389 she also became Queen of Sweden. In 1397, by the Union of Kalmar, she united the three kingdoms under one ruler. During the next few centuries Norway sank to the state of a Danish province, and it was not until 1814 that there came a national awakening. In this year the Danish King Frederick VI was forced to cede Norway to Sweden because he had been the ally of Napoleon. The Norwegians refused to acknowledge this summary disposal of their nation, and at a meeting of delegates a constitution was adopted and the crown of Norway tendered to the Danish Crown Prince Christian Frederick. Upon the invasion of Norway by a Swedish army, a compromise was effected whereby Norway was proclaimed a "free, independent and indivisible kingdom, united with Sweden under one king."

This union did not prove satisfactory to the people of Norway, and when King Oscar in 1905 refused to yield to the Norwegian Storthing in its demand for a separate consular service, it declared the country independent. When the question was laid before the people they decided in favor of the separation by an overwhelming majority. As a mark of friendship the Storthing asked King Oscar to name one of his sons as the King of Norway, and on his refusal, Charles, the son of the King of Denmark, was chosen. He took the name of Haakon VII, and was crowned in 1906. Since then the country has been peaceful and prosperous. Women are granted municipal and Parliamentary suffrage on equal terms with men. In 1911 the University of Christiania celebrated its centenary. Population 2,570,923.

Nor'wich, Conn., a city and one of the county seats of New London Co., 13 m. n. of New London and 95 m. w. of Boston, Mass., on the Thames River at the junction of the Shetucket and Yantic rivers and on the Central Vermont and the New York, New Haven & Hartford railroads. It is at the head of navigation on the Thames, 14 m. from Long Island Sound, and has a commodious harbor. Norwich has a large trade in lumber, coal, farm products and clothing for the western part of Connecticut. The city has excellent water power and is one of the prominent manufacturing centers of the state. There are manufactories of a great variety of articles, which include firearms, leather, cotton and woolen goods, silk fabrics, velvets, belting, paper, stoves, furniture and woodworking machinery. There is also considerable shipbuilding. There are many handsome residences which occupy several terraces in the most elevated parts of the city. The streets are broad and shaded with beautiful maples and elms.

Among the educational institutions are the Norwich Free Academy including the Slater Art Museum, and the Otis Free Library. The state insane asylum, state armory and the William W. Backus Hospital are located here. The Indian

burial ground, where Uncas, the founder of the Mohegan tribe, is buried, is of historic interest. Norwich was settled in 1659 by a company from Saybrook and named after Norwich, England. It was chartered as a city as early as 1784 and rechartered in 1871. Population in 1920, U. S. Census, 29,685.

Nor'wood, Mass., a town of Norfolk Co., 14 m. sw. of Boston, on the New York, New Haven & Hartford Railroad. Included among its industrial plants are tanneries, iron foundries, railroad repair shops, two large printing plants, book binderies and manufactories of ink and glue. The Morrill Memorial Library is located here. Norwood was incorporated as a town in 1872. Population in 1920, U. S. Census, 12,627.

Norwood, Ohio, a city of Hamilton Co., n.e. of Cincinnati, of which city it is a residential suburb, on the Baltimore & Ohio Southwestern, the Pennsylvania and the Norfolk & Western railroads. It is delightfully situated on a site of great natural beauty and is a popular residence place for many Cincinnati business men. It is also a manufacturing city of considerable importance, many of the establishments being noted for their excellent equipment. The industrial establishments include elastic bookcase works, a playing-card factory, enamel-sign works, lithograph works, a paper-bag factory, a carriage and wagon factory, hardware and iron-casting works, wood-mill workshops and laundry-machine shops. There are many fine public buildings and a number of branch libraries of the Cincinnati Public Library. Norwood was settled in 1790, incorporated as a village in 1888 and received a city charter in 1903. Population in 1920, 24,966.

Nose, the respiratory organ through which the air enters the trachea, and also the seat of the sense of smell. In man the nose is triangular and has a bony framework consisting of the nasal bones and the vomer, which forms the partition between the nostrils. The nose contains front and back passages, the former called the nostrils and the latter, the nares. The nostrils are lined with cartilage and a mucous membrane, in which in the upper part of the nostrils the filaments of the olfactory nerve are distributed. In some of the lower animals the nose forms a more prominent part of the face. In the dog it forms the muzzle, and in the elephant and tapir it is prolonged into a proboscis. See SMELL.

No'tary Pub'lic, an officer authorized to attest or certify legal documents. In the United States notaries are appointed by the governors of the states for a term of four years upon petition of from 50 to 100 legal voters. Some states, however, compel notaries to give bonds for faithful performance of their duties. A notary may acknowledge legal documents, as deeds or mortgages; may take depositions of evidence; and in some states may exercise the powers of a justice of the peace. A notary receives fees for his services but is disqualified from acting in any matter in which his own interests are involved.

Notre Dame, *No' tr' Dam',* **University,** at Notre Dame, Ind. (1842). This is a Roman Catholic institution in charge of the Fathers of the Holy Cross, and on the grounds is the Provincial House of the Order for the United States. This university maintains schools of arts and letters, science, engineering, pharmacy, architecture and law. It has a preparatory department and maintains other such schools in different parts of the country. Its buildings are valued at $2,000,000. The library contains some 60,000 volumes. There are over 1000 students in all departments.

Nottingham, *Not' ing am,* a municipal borough and county, the capital of Nottinghamshire, England. It is situated 130 m. n.w. of London, at the confluence of the Leen and the Trent, and is built, in large part, on a sloping rocky eminence crowned by an ancient castle. The fine public buildings include the University College (owned by the municipality), the Exchange, the town and county halls, the Roman Catholic Chapel and St. Mary's Church. Various modern improvements in the way of libraries, parks, gardens, lighting plants, etc., have

been effected through the efforts of the municipality. As an industrial center of prominence, it is known for its manufacture of bobbinet, lace, cotton and silk hosiery, bicycles, baskets and brass products. The castle was built by William the Conqueror and has been the scene of many important historical events. The city is now the seat of a United States consulate. Population, estimated at over 250,000.

Novaculite, *No vak' u lite,* a fine-grained quartz, used for whetstones. The best quality of novaculite is quarried in Garland County, Arkansas, and is called Arkansas stone. From it the finest oil-stones and razor hones are made. See QUARTZ.

Nova Scotia, *No' va Sko' shi a,* a province of the Dominion of Canada. Nova Scotia is a peninsula joined to New Brunswick by the Isthmus of Chignecto, which is 11½ m. wide. The peninsula is surrounded by the Gulf of St. Lawrence on the n., the Atlantic Ocean on the s.e. and the Bay of Fundy on the n.w. Cape Breton Island, which constitutes a part of the province, is separated from the mainland by the Strait of Canso. The length of the peninsula from northeast to southwest is 374 m., its width varies from 30 to 100 m. and the area is 21,428 sq. m., making it next to the smallest province in the Dominion. Population in 1911, 492,339.

SURFACE. A ridge with steep slopes extends along the Bay of Fundy from Brier Island to Cape Blomidon, a distance of about 130 m. There are occasional rocky summits on this ridge, varying in height from 200 to 600 ft. The Cobequid Mountains extend eastward from Cape Chignecto to the Atlantic coast and in their highest altitudes are about 1000 ft. On each side of this range of hills are extensive tracts of comparatively low, fertile land, the Annapolis Valley on the south being known as the Garden of Nova Scotia. The Atlantic coast is high and contains many good harbors. The most widely known indentation is Minas Basin, famous as the scene of the first part of Longfellow's *Evangeline.* On its shores is the little village of Grand Pré, which is visited by many tourists.

RIVERS AND LAKES. The rivers are few and small, but flow into the sea through estuaries that are navigable from 2 to 20 m. The most important streams are the Annapolis, the Avon, the Shubenacadie, the East, the Middle and the West rivers of Pictou County, the Musquodoboit and the Lahave. Lake Rossignol in Queens County is the largest fresh-water lake in the peninsula. Bras d' Or Lake on Cape Breton Island is an arm of the sea.

CLIMATE. The climate is free from extremes of heat and cold and is milder than that of the inland provinces of the same latitude. Being nearly surrounded by water, Nova Scotia is subject to fogs, but they are not considered injurious to health. The summers are cool and enjoyable. The average rainfall is about 45 inches.

MINERALS AND MINING. In Cape Breton and the northern part of Nova Scotia are some of the most valuable bituminous-coal measures in North America. On the island and in Cumberland and Pictou counties coal mining is an important industry. The annual output of all the mines is over 6,000,000 tons, much of which is exported to the United States. Considerable iron is produced in the countries where coal is found, and blast furnaces are located at New Glasgow and Sydney. There are large deposits of gypsum near Windsor in Hants County, and manganese and copper are mined in a few localities.

FISHERIES. Next to those of British Columbia, the fisheries of Nova Scotia are the most important in Canada and they give employment to a large number of people, over 25,000 men being required to man the vessels. Cod, mackerel and lobsters constitute the bulk of the catch. The entire yearly output is valued at about $8,000,000, about one-third that of the Dominion.

FORESTS AND LUMBERING. Forests formerly covered a large part of the province, but most of the forested area

has been cleared and the land converted into farms. Lumbering, however, continues to be an important industry and sawmills are quite generally distributed. The manufacture of wood pulp is also important.

Agriculture. The soil along the streams and in the valleys is generally fertile. Owing, however, to the importance of coal mining, lumbering and the fisheries, agriculture has not been so fully developed as it otherwise would have been. All cereal crops are successful, and in the Annapolis Valley large quantities of apples and peaches are grown, Nova Scotia ranking next to Ontario in the production of apples. Small fruits are also raised for supplying New England markets. Dairying is yearly receiving increased attention and considerable quantities of butter and cheese are exported to England. The region around Minas Basin is noted for its production of hay, and raising live stock is the leading agricultural industry in this part of the province.

Other Industries. The leading manufactures are connected with the production of lumber, wood pulp and iron and steel, as noted above. The streams furnish abundant water power, only a small part of which is utilized. There are a number of sugar refineries; a few cotton mills and coke ovens are found in the coal regions. An extensive commerce is carried on with the Bermudas, the West India Islands and the New England ports of the United States.

Transportation and Communication. The main line of the Intercolonial Railway, which is owned and operated by the Dominion Government, extends from Halifax into New Brunswick. It has a branch extending to North Sydney and connecting New Glasgow with the main line. Branches also extend to Truro and to Pictou and Stellarton. There are also a number of short, local lines connecting Halifax with Yarmouth and a few other commercial centers. Halifax is the chief seaport and has lines of steamers plying to the various ports of Europe and those of the Atlantic coast to the United States, and to the Bermudas and West Indies. Yarmouth is also an important port. There are a number of wireless-telegraph stations in the province, the most important being at Halifax, Sable Island and Glace Bay. There are trans-Atlantic cable stations at Canso and Sydney. Local telegraph and telephone lines are found throughout the province.

Government. The chief executive is the lieutenant-governor, appointed by the governor-general of Canada for five years. He is assisted by an advisory council consisting of heads of the departments of the provincial government. The Legislature consists of two branches, a Legislative Council of 21 members and an Assembly of 38 members. The judges of the courts are appointed by the Dominion Government for life.

Education. There is a good system of free elementary schools and attendance upon them is compulsory. Secondary education is optional, but is well provided for. One high school in each county is raised to the rank of an academy and is open free of tuition fees to those qualified to enter. There are Roman Catholic Colleges at Antigonish and St. Anne. The Dalhousie University at Halifax is undenominational and is the leading educational institution. A provincial normal school and agricultural and horticultural schools are located at Truro, and the College of Technology has been established at Halifax.

Cities. The chief cities are Halifax, the capital; Sydney, in Cape Breton; Pictou, Yarmouth, New Glasgow and Truro.

History. Cape Breton was visited by the Cabots in 1497-98. In 1604 the French made a settlement at what is now Annapolis. From this time until the Treaty of Paris, 1763, the province was the scene of many conflicts in which the French, English and Indians participated. The region was known as Acadia until 1621, when, under a grant to Sir William Alexander, it was named Nova Scotia. In 1654 Cromwell secured possession of the country and it remained

under British control until 1667, when it was ceded to France, but it was returned to the English by the Treaty of Utrecht, 1713. In 1749 Halifax was founded. In 1755 about 6000 French settlers were deported to the English colonies because of alleged disloyalty to the British Government. In 1763 Nova Scotia became a permanent possession of Great Britain, and English and Scotch settlers began to enter the country. It continued as a separate province until 1867, when it became a member of the Dominion of Canada. Since that time its record has been one of continued prosperity.

No'va Zem'bla, a group of islands in the Arctic Ocean, forming a part of the Government of Archangel in Russia. There are two large islands of a combined area of 34,500 sq. m., with indented coast line and rocky and mountainous surface. The cold climate dwarfs vegetation; there are large numbers of fur-bearing animals and in the waters are seals and whales. Practically the only inhabitants are visiting hunters and fishermen.

Novem'ber, the 11th month of the year, containing 30 days. The name is derived from the Latin word meaning ninth, as this was the ninth month of the old Roman year. When the calendar was changed by the adding of January and February, the name of November remained unchanged, although it became the 11th month. The Anglo-Saxons called it the blood month, probably because of the slaughter of cattle in that month for winter consumption. See CALENDAR; MONTH; YEAR.

Noyes, Alfred (1880-), an English poet, born in Staffordshire, and educated at Exeter College, Oxford. He is a foremost writer of ballads and of patriotic, heroic and occasional verse, and has also produced literary criticism. He has contributed to numerous English and American periodicals, including *Blackwood's Magazine,* the *Fortnightly Review,* the *Atlantic Monthly* and the *Bookman.* A virile and versatile poet, he has a wonderful command of words; his meters are admirable, both in form and clearness; and he writes with decision and confidence. His works include numerous short poems; *The Forest of Wild Thyme* and *The Flower of Old Japan,* fairy tales in verse for children; *Drake,* an epic; *The Enchanted Island and Other Poems; Tales of the Mermaid Tavern; Sherwood,* a play; and *Life of William Morris.*

Nu'bia, a region of Egypt lying between the section known as Egypt and the Egyptian Sudan. In east and west extent, it stretches from the Red Sea to the Sahara Desert. Though it is traversed by the Nile throughout its entire length, Nubia is almost wholly desert, for the valley of the Nile is so narrow here as to leave little space for cultivation. In the mountain gorges at the north, upon the islands and between the Nile and its tributary the Atbara, however, agriculture is the chief occupation. Cereals, cotton, tobacco, coffee, senna, dates and indigo are raised. Elsewhere irrigation makes some cattle raising possible. Nubia is traversed by many caravan routes from Suakin, the chief port upon the Red Sea, and the West. The people are mostly Hamitic, known as Berbers, and Arabic. Khartum, Omdurman and Berber are the principal inland cities and are situated upon the Cape-to-Cairo Railway. See EGYPT.

Nul"lifica'tion, the act of making any rule, declaration or order null and void. In American history it signifies the refusal of a state to obey an act of Congress. The famous Kentucky Resolutions of 1798 asserted the right of nullification, but the first definite expression of the constitutional right of the states to render null a Federal law occurred in 1828, when Calhoun drafted his *Exposition and Protest* for the South Carolina Legislature, in opposition to the protective tariff of that year. The publication of this *Exposition* in 1830 led to the famous Webster-Hayne Debate on states' rights. In 1832 another protective tariff law was passed, and in November of that year the South Carolina Legislature adopted an ordinance declaring the tariff acts of 1828 and 1832 null and

void. President Jackson, however, took steps to enforce the collection of duties at Charleston, and also issued a proclamation warning the people of South Carolina that the Federal laws must be obeyed. Congress passed the Force Bill in March, 1833, but in the meantime a compromise tariff had been agreed upon and the Nullification Ordinance was repealed.

Nu'ma Pompil'ius, second legendary King of Rome, is said to have ruled from 715 to 672 B. C. He was of Sabine origin and is said to have founded the religious ceremonies and institutions of Rome. These were revealed to him by his goddess wife, Egeria, whom he met in a grove by a sacred spring. His writings explaining his system were discovered and burned by order of the Senate 400 years after his time.

Num'bers, the fourth book of the Bible and of the Pentateuch, and so named from the two *numberings* of the Children of Israel, at the beginning and end of their wanderings. Covering a period of over 38 years, *Numbers* includes the breaking up of the camp at Sinai, the march upon Canaan and the repulse, the confirmation of Moses and Aaron in authority, several events of the 40 years' wanderings, and the events of the final year. This book also contains numerous fragments of poetry.

Numismatics, *Nu"miz mat' iks,* the science of coins and medals. See MINT.

Num'mulite, a nearly extinct genus of minute animals belonging to the family of Foraminifera. They resemble coins in shape and range in size from the dimensions of a pinhead to those of a silver dollar. During the Tertiary Period they flourished in vast numbers in nearly every part of the world. Enormous limestone deposits formed of nummulite shells are found in northern Africa, Asia Minor, Persia, India, China, Central America and parts of the Alps. Some of these are several hundred feet in thickness. See FORAMINIFERA.

Nuncio, *Nun' shi o,* in the Roman Catholic Church, the title of an ambassador of the highest rank, who represents the pope at a foreign court. The nuncio is not a cardinal. An ambassador of the highest rank, who is also a cardinal, has the title of legate. The nuncio's duties are limited to those of an ambassador.

Nu'remberg, a city of Bavaria, Germany, situated on the Pegnitz River, about 95 m. n.w. of Munich. The river divides the inner town into two parts, Sebalderseite and Lorenzerseite, so named after the two largest churches. Surrounding these parts are the suburbs, representing the site of the industrial establishments of the town. The buildings, still retaining many medieval features, are very impressive, and fine samples of domestic architecture from the 15th to the 16th centuries exist. The Church of St. Lawrence and that of St. Sebaldus are handsome Gothic edifices and contain specimens of work by some of the greatest of the old, well-known Nuremberg artists. Secular buildings of prominence are the Kaiserburg, the town hall, the chamber of commerce and the National Germanic Museum. Among spots of interest to tourists are the home of Dürer, the artist, and the quaint little house where Hans Sachs, greatest of the mastersingers, cobbled his shoes and made verses to the sound of his hammer, so poetic that Wagner saw fit to immortalize his name in one of the most impressive operas of modern times.

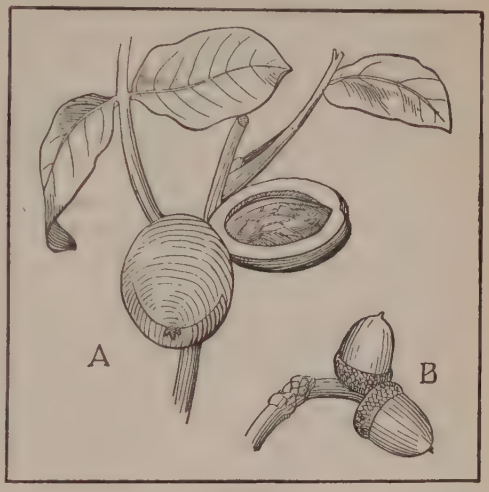
The industrial wares of Nuremberg comprise toys, small articles of gold and silver, hardware, lead pencils, ivory, watches and gold leaf. There are large chemical and machine works and manufactories of railway cars, lithographs, chromos and electrical supplies. Nuremberg has been known to history since 1050. It accepted the Reformation in 1524, and during the Thirty Years' War it was occupied by Gustavus Adolphus, suffering such heavy losses that in 1796 it offered itself (without being accepted) to the King of Prussia, in order to obtain relief from its heavy debt. It was annexed to Bavaria in 1806. Population in 1905, 294,426.

Nurs'ery, in agriculture, a place where trees, shrubs and vines are grown

for transplanting or for grafting; herbs and house plants are also grown, but their propagation and care is generally carried on in conservatories or greenhouses. Shrubs and trees for ornamental purposes are largely grown and fruit and shade trees are also raised. Much has been done by nurserymen in improving species, propagating varieties resistant to disease and learning about the habits of plants and the insects and diseases that attack them. There are nearly 5000 nurseries in the United States, occupying over 172,000 acres of land. In them about 3,400,000,000 trees and lesser plants are constantly being raised. Western New York, near Rochester, is at present the center of the nursery business of the United States.

Nur'sey, Walter R. (1847-), a Canadian journalist and public official, born in England and educated at Marlborough College. In 1865 he came to Canada, where in time he entered the service of the Hudson's Bay Company, later becoming a free fur trader. Successively he was the commissary for surveyors, paymaster to the Chippeway Indians in Lac-la-Pluie, stipendiary magistrate in Keewatin, a government transporter of Indian supplies to the Far West, besides chief health officer and fur inspector for Keewatin during 1876 and 1877. Later he was deputy minister of agriculture and provincial auditor for Manitoba and inspector of the Ontario public libraries. Besides contributing frequently to English and American periodicals, he has written prolifically on his wide travels, which were mostly made by canoe, snowshoe, dog train and pack horse.

Nut, a name given to a class of fruits which are dry rather than fleshy and have a hard, woody covering which encloses the seed. Nuts generally have but one cell and one seed, though the halves may be more or less separated by a thin, woody partition. When the flowers, which precede the nut, have been surrounded by a cluster of tiny leaflets, called an involucre, which seems to be a part of the flower, the fruit is surrounded by a bur, like the chestnut, a leafy husk like the hazelnut, or merely held in a cup, like the acorn; this covering regardless of its character is called a cupule. Nuts, being the storehouses of food for the new plant, are commonly



NUTS

rich in oils, proteids and starch, and hence are an important food product.

Our best-known nuts are the hickory, beech, walnut, chestnut, hazel, pecan and almond. Other nuts grown only in tropics, as Brazil nuts and coconuts, are imported annually and are of great nutritive value. In the illustration A represents the walnut, and B the acorn.

Nut'crack"er, a peculiar Western bird of the Crow Family, about the size of the common pigeon. The plumage is distinct and well marked and the black wings with their white patches are set off by the ashy-gray body. The nest is usually placed in evergreen trees, often 40 ft. above the ground, and is made of twigs bound together by strips of bark and lined with grass and pine needles. Three to five eggs, spotted with brown and gray, are laid. In the winter the food consists principally of pine cones, but at other times is of insects, berries and various seeds. The young are fed on hulled pine seeds. This nutcracker, sometimes called Clarke's crow, is typi-

cally a bird of the mountains, where it makes the most astonishing flights, frequently dropping from the top of a mountain to the valley below, sometimes a distance of nearly 1000 ft., and catching itself by opening its wings like a parachute. It inhabits the pine regions of the West from Mexico to Alaska.

Nutgalls. See GALLS.

Nut'hatch" Family, a number of species of small birds about the size of a canary, numerous in both hemispheres. They are easily distinguished by their habit of clambering up and down trees and along the branches, going headfirst in either direction with equal facility.

COMMON NUTHATCH

When seen circling a tree in spiral course, they are in search of the insects upon which they feed. The nest is placed in a cavity excavated in a dead tree or stump, and is made of leaves, grass, feathers and hair. Sometimes an old woodpecker's nest is used. From four to six eggs are laid.

WHITE-BREASTED NUTHATCH, or TREE MOUSE. This species is common throughout North America. The birds are about six inches long; the body is bluish-gray above and white below; the top of the head and the neck are black; the wings are black, blue and white; the tail is black, marked with white; and the under feathers are brown. The bill is long and pointed; the tail, short and square. The note is a nasal "yank-yank" repeated "ya-ya."

RED-BREASTED NUTHATCH. The red-breasted nuthatch is smaller than the white-breasted and is usually found in flocks. In winter these birds frequent evergreen forests where they feed upon grubs, secured by prying off scales of bark. The breast is red, but otherwise in color and in habits they resemble the white-breasted nuthatch.

Nut'meg, the fruit of a tropical tree of the Myristica Family. The tree is regular in form and grows from 20 to 30 ft. in height. The branches and leaves are of a shiny, gray-green color and have a pleasing appearance. The leaves are long and pointed, having well-marked veins, and the flowers are in drooping clusters of bell-like blossoms, much resembling our lilies-of-the-valley. On different trees, however, the flowers are different in structure: those of one plant are staminate, that is, having the stamens which contain the fertilizing dust; and of another, pistillate, or fruit-producing. The entire fruit is small and resembles a yellow peach in color and general form. As it matures, the flesh becomes leathery, then divides from the top, disclosing a bright scarlet membrane which entirely covers the seed or nut and which is the source of the spice, mace.

Nutmegs must grow about nine years before they are ready to bear, and in order to be sure that the trees will be pistillate, or fruit-bearing, the natives graft branches of pistillate trees upon all the young saplings. For shipping, the nutmegs are merely dried in an oven and packed. Nutmeg is grown in Ceylon, China and both the East and West Indies.

Nutrition, *Nu trish' un,* those processes by which plants and animals convert food into living tissue, thus repairing waste and promoting growth. In human physiology nutrition includes digestion of food, absorption of the digested food and its conveyance by the blood to all the tissues and organs, and those chemical changes necessary to transform the digested food into the various tissues. The term *assimilation* is often applied to the last-named process. Elimination, or

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PLANTS FURNISHING VALUABLE PRODUCTS

the gathering and expelling from the body of waste matter, is sometimes considered with nutrition because the processes are so closely related. See ABSORPTION.

Nux Vom'ica, a plant, or, more properly, the seeds of a plant of the Gentian Family, from which strychnine is obtained. In warm countries, where it is chiefly found, the plant is a medium-sized tree with smooth, spreading leaves and loose clusters of flowers. The fruit is a large berry, often five or six inches in circumference, and has a dry shell encircling the white, juicy pulp. The seeds, which are poisonous, are very bitter. The wood, called snakewood because it is thought to be an antidote for snake bites, is used also in constructive work; the bark is said to cure leprosy. Nux vomica is native in China but is also grown in Ceylon, Mexico and the Philippines, and is frequently known as Ignatius bean or the bean of St. Ignatius. See STRYCHNINE.

Nyassa, *Nyah' sah,* a large lake in the southeastern part of Africa, situated about 380 m. from the Indian Ocean, and southeast of Lake Tanganyika. It is 340 m. long, has an average breadth of 40 m., a maximum depth of 700 ft. and an area of 14,200 sq. m. Mountains surround the lake on all sides, through the gaps of which rivers find their outlets into the lake. The Shiré River drains its waters into the Zambesi. It was discovered by Livingstone in 1859.

Nye, *Ni,* **Edgar Wilson** (1850-1896), an American humorist, better known as Bill Nye, born in Shirley, Me. He studied law, removed to Laramie, Wyo., and was admitted to the bar in 1876. There he also served as postmaster, justice of the peace, superintendent of the schools and member of the city council. He was elected to the Legislature and was a newspaper correspondent, contributing humorous articles under the pen name of Bill Nye, chiefly to the Denver *Tribune* and the Cheyenne *Sun.* In 1881 he founded the *Boomerang* at Laramie. Later he removed to New York, and finally to Arden, N. C. His reputation as a humorist was firmly established and because of his ready wit and skill in punning he remained a general favorite. His works include *Bill Nye and the Boomerang, Forty Liars, Baled Hay, Bill Nye's Blossom Rock, Remarks, Chestnuts, Fun, Wit and Humor, The Cadi, Comic History of the United States* and *Comic History of England.*

Nymphs, *Nimfs,* in myths, lesser female deities, beautiful and always young. Those dwelling in mountains were called Oreads; in the water, Naiads; in trees, Hamadryads; in forests, Dryads; and in the sea, Nereids or Oceanids. They reared many gods and heroes, attended various divinities and were guardian spirits of places, individuals and races. They were worshiped with Pan in caves or at the springs where they dwelt, and their worship was widespread.

O

OAK, the name of a number of widely distributed trees of the Oak Family. The family contains a few shrubs and low, bushy trees, but the majority of oaks are stately trees, which have an appearance of solidity. There are so many species that in a general way they can be only roughly characterized. The bark is usually dark and furrowed so deeply that heavy, woody ridges mark the trunk; in many oaks, however, the bark is lighter colored and somewhat scaly. The wood, especially that of the white oak, is heavy and valuable. Almost all oaks are easily recognized by their large, gnarled branches, seldom concealed by the leaves. These leaves are variable in shape and are found in a variety of forms even on one tree; the typical oak leaf is the broad-topped, lobed variety, which is always noticeable in the autumn for its brilliant coloring. In texture, the leaves are almost brittle in their papery crispness, and the veins, prominent in the center of the leaf, are tough and fibrous. The flowers bloom after the leaves open in the spring and appear in two forms: long, hanging catkins and short-stemmed, erect pairs of blossoms growing in the axils of the leaves; the latter produce the cup-borne acorns, sometimes edible and sometimes bitter, but always attractive.

The oak grows in all north temperate regions, in the New World as far south as the mountains of Colombia and in the Old World to the Indian Ocean. There are nearly 300 species, 52 of which are common in North America, and five of which are shrubs. The best known are: the white oak, valuable for its lumber, which is used extensively in the manufacture of furniture and for interior decoration, railroad ties and fuel; the bur oak, whose acorn cup is mossy; the yellow oak, whose inner bark yields a yellow dye; the chestnut oak, whose bark is black and deeply ridged; and the live oak, which grows chiefly in the south and is famous for its great low-branched trunk and spreading limbs. Other oaks are red, black, scarlet, Spanish, jack, willow, laurel, single, overcup and cork oaks. The last is a Spanish and Portuguese tree which produces commercial cork.

Everywhere the oak has been famous. The Druids practiced many of their rites beneath the boughs of oak groves and early English ballads have preserved for us the stories of the oak of Robin Hood. Famous, too, are the oak of Dorset, which had an alehouse in its mammoth trunk; the oak of Flushing, which, in contrast, held a Quaker meeting-house; the Charter Oak, in whose hollow base Connecticut's charter lay safely hidden; and the peace oak, sacred to the memory of Eliot and his work with the Indians. See CORK; GALLS; TREE; CHARTER OAK.

Oakland, Cal., the third city in population in the state, and county seat of Alameda Co., on the east, or continental, side of San Francisco Bay, opposite the city of San Francisco, and on the Southern Pacific, the Atchison, Topeka & Santa Fe and the Western Pacific railroads. Passengers and freight from the East are transferred by ferry to San Francisco from Oakland, the railway piers and moles running out into the bay for a distance of 2 m., thus shortening the distance between the two cities. Electric lines also extend to Berkeley, Hayward, Piedmont, Emeryville and various other suburban cities, as well as the interior valleys, the Sacramento and San Joaquin. The Brooklyn Basin, a part of Oakland Harbor, has 300 acres of anchorage, and the shipping trade is steadily expanding. The cities of Oakland, Berkeley, Emeryville and Alameda, practically one community, have a combined water front of about 35 m., and extensive wharves have been constructed by

the Federal and municipal governments. The chief industrial establishments include extensive ironworks, shipbuilding plants, planing mills, cotton mills, canneries, candy factories, flour mills and lumberyards. Electric power is obtained from Colgate, 219 m. distant.

Oakland has an area of 60 sq. m. and is attractively located. It is a city of parks and plazas. Lakeside Park, the largest of the 26 parks, contains a fine grove of oak trees, from which the city takes its name. Lakeside surrounds and stretches out into the waters of Lake Merritt, which is a natural salt-water lake of 170 acres in the heart of the city, filled by the tidal flow of San Francisco Bay. This lake is a favorite pleasure resort and is encircled by broad boulevards and handsome homes surrounded by gardens, lawns and flowers. Foothill Boulevard, reaching from Oakland to Hayward, is one of the most magnificent scenic roadways in the state. This road is 12 m. long, with a 70-foot roadway, and the original cost of building was $300,000. The most noteworthy buildings include the Masonic Cathedral, the Athenian, Elks', Nile and Ebell club buildings, the Y. M. C. A. and Y. W. C. A. buildings, post office, city hall, the Hotel Oakland and Claremont Hotel, Oakland Free Library, about 103 fine churches and 26 missions. Oakland has many hospitals, asylums and homes, including the State Industrial Home of Mechanical Trades for the adult blind. The city has exceptional educational advantages. The University of California with six thousand two hundred fourteen students, six hundred instructors, eight magnificent buildings, and with a beautiful campus adjoins the north boundary line; St. Mary's College (Catholic); St. Joseph's Academy; Snell Seminary; many private, commercial and parochial schools; five high schools; and about fifty public schools. Mills College for women, near the eastern limits of the city, is one of the best-known educational factors of the state, is growing very rapidly and now ranks as one of the best colleges for women in America.

The site of Oakland lay originally within the limits of a private Mexican grant, which was confirmed by the Federal authorities. A settlement was first begun in 1850, and in 1852 the town was incorporated. It became the county seat in 1874. The commission form of government was adopted in 1910. Population in 1920, U. S. Census, 216,261.

Oats, an important grain of the Grass Family. A wild species is found among the grasses everywhere and is probably the parent of the cultivated species. There are many species of oats which are adapted to different soils and climates. They furnish straw and the grains which are used as feed for horses and cattle, and for various prepared foods, as oatmeal, rolled oats, etc. As a food oatmeal is widely popular because of its cheapness and high nutritive value, as well as its pleasing taste. Oats yield from 40 to 80 bushels to the acre. The crop in the United States for 1918 was 1,535,297,000 bushels, and of this Iowa and Illinois produced respectively 246,750,000 bushels and 244,400,000 bushels, each being nearly three times that produced by any other state.

O"badi'ah, the shortest of the prophetic books of the Old Testament, coming between the books of *Amos* and *Jonah*. The contents of this book, which contains but one chapter, are concerned with the doom of Edom. Obadiah, author of the book and one of the 12 minor Hebrew prophets, lived in the days of Amaziah. See BIBLE, subhead *The Old Testament*.

Ob'elisk, a four-sided column, generally made from a single stone and tapering toward the summit, which is cut into pyramidal form. This top is called a pyramidion. The obelisk was the favorite form of memorial architecture in ancient Egypt and was covered with hieroglyphics, recounting triumphs of war or catastrophes of flood or plague. Many of these obelisks have been carried to distant countries; one may be seen in Rome, one in Paris, and the two known as Cleopatra's Needles are separated, one being in New York and one in London.

Oberammergau, *O' ber ahm' mer gou".* See PASSION PLAY.

O'berlin College, at Oberlin, Ohio (1833). This was the first coeducational college in America. Instruction was begun in 1833, before the charter for the Oberlin Collegiate Institute was secured. Collegiate instruction was begun, and a theological seminary of the Congregational Church opened, about 1835. In 1850 the Institute became Oberlin College. There are now also departments of music, drawing and painting; and a summer school is maintained. The college has a library of about 185,000 volumes, some 20 buildings and total assets amounting to $10,027,626. There are about 1500 students; and a large proportion of them, as in the past, are to a considerable degree self-supporting.

O'bi or **Ob,** a river of Siberia, rising in the Altai Mountains and flowing north and northwest through the Siberian governments of Tomsk and Tobolsk for a distance of about 2500 m., after which it empties into the Arctic Ocean through the immense estuary of the Gulf of Obi. The Irtysh, its main tributary, surpasses it in length; the total length, including the different tributaries, is 9000 m. It is not used to a great extent as a waterway, and near its mouth it is ice-locked between October and June.

Oboe, *O'boi,* or **Hautboy,** *Ho'boi,* a musical instrument consisting of a box made of ebony or rosewood and divided into three sections, which when joined end to end form a box about 20 inches long, with a bell-shaped mouth. From this mouth a smaller brass tube containing a vibratory reed extends to the other end of the instrument. The modern oboe has keys similar to those on the clarinet, and is considered an important instrument in an orchestra. The oboe is one of the ancient musical instruments.

Observatory, *Ob zurv' a to ry,* a place or building set aside for observing natural phenomena, such as the weather, magnetism of the earth and the movements of the heavenly bodies. Astronomical observatories are the most interesting, and are the class usually designated when the term is used without qualification. So far as known, the first astronomical observatory was constructed by the Greeks at Alexandria in 300 B. C. The first observatory in Europe was built at Nuremberg in 1472; that of Tycho Brahe was completed in 1576, and the results of Brahe's observations led to the construction of others. The observatory at Greenwich, England, was opened in 1675, the observatory at Yale in 1830 and that at Harvard in 1839. The United States Naval Observatory at Washington was organized in 1842. In 1912 there were 28 observatories connected with colleges and universities in the United States. The most celebrated of these are the Lick Observatory and the Yerkes Observatory, each of which is described under its title.

For best results, an observatory should be located where the atmosphere is clear, and away from railways and heavy machinery, so that the delicate instruments will not be affected by tremors of the earth. The most desirable location is an elevation, which combines with the advantages named, that of a wide sweep of the horizon.

The building consists of low walls resting on a firm foundation and supporting a dome, which can be turned so that the opening for the telescope may face any part of the sky. The telescope is the chief instrument of every astronomical observation, and it is mounted on a support directly under the center of the dome. The other instruments are the transit and sidereal clock. See TELESCOPE.

Obsid'ian, a volcanic rock having the structure and appearance of glass. It is composed of silica, combined with aluminum, calcium, iron, potassium and sodium. It is brittle and hard, has a glassy luster and is variously colored, black, yellow, gray and brown predominating. Like glass it breaks into sharp-edged fragments, and this property has rendered it a valuable material for primitive peoples, who have used it for making arrow points, spearheads, knives and razors. The ancient Greeks and Ro-

mans made mirrors of it, and esteemed it as a gem. It is occasionally used today as an ornamental stone. In chemical composition obsidian is identical with granite and similar to pumice, but differs from both in physical properties. It occurs in regions which have undergone later volcanic action; and in Iceland, the Azores, Milo, California, Mexico, Hungary and New Zealand. The Obsidian Cliff is one of the features of Yellowstone National Park.

Ocean, *O' shan,* or **Sea,** the vast continuous body of salt water which covers three-fourths of the earth's surface. It is divided by the continents and by imaginary boundaries into five parts. These five oceans are the Pacific, separating Asia from the two Americas; the Atlantic, lying between America and Europe; the Indian, south of Asia; and the Arctic and Antarctic oceans, which lie about the North Pole and South Pole respectively. The floor of the ocean presents irregularities similar to those of the land, being marked by depressions and elevations corresponding to hills and valleys of the land surface. The greatest depths that have thus far been reached are 31,614 ft., near the Island of Guam in the Pacific, and 27,366 ft., near the Island of Porto Rico in the Atlantic. These are in the great valleys of the ocean bed; the islands occupy the plateaus. The mean oceanic depression sinks much lower below the water level than the mean land elevation rises above it. Throughout the ages the land has been worn down by erosion (See EROSION) and a large part of it deposited in the sea by rivers. Along many coasts the ocean is comparatively shallow for a considerable distance from shore, being often less than 100 fathoms in depth. This belt of shallow water overlies what is called the continental shelf, or that portion of the original continental coast which has been submerged by the sea.

The waters of the ocean are constantly moving in currents (See CURRENTS, MARINE). Drifts are movements of the water in an easterly and westerly direction, more changeable in their direction than currents and slower-moving. Tides are waves moving regularly across the ocean under the influence of the sun and moon (See TIDES). Tidal waves are infrequent phenomena caused by earthquakes. They traverse the sea from shore to shore, often submerging vast areas of land and causing great damage. The currents of the ocean tend to equalize its temperature. The temperature of the ocean surface, therefore, while it varies with latitude, presents less marked variation than the land, and the change in temperature with the seasons is less marked. The greatest annual variation in one locality is off the coast of Newfoundland, whose shores are washed at certain seasons by cold currents from the north and at others by warm currents from the south. At a depth of about 4000 fathoms, or approximately 24,000 ft., the temperature is practically uniform throughout the ocean's entire expanse, ranging from 32° to 35°. Because of the currents the ocean never freezes solid even in the coldest regions; and owing to the low freezing point of salt water (28°), it is kept from freezing below the surface even in high latitudes. The sea has a marked effect upon the climate of adjacent lands, tempering the cold of winter and moderating the heat of summer by tempering the winds which blow over them.

The chief constituents of sea water are the soluble salts, chlorides and sulphates of the alkalies and alkaline earth. It is its brackish quality which imparts to the water its deep blue and green hues. At the bottom of the sea all is darkness; no light penetrates to the abyss. However, notwithstanding the darkness, the cold and the enormous pressure of the overlying waters, there is an abundance of both vegetable and animal life. The marine life of the Arctic regions is more varied and abundant than the life in the same latitude on land.

The ocean is the great reservoir from which nearly all the circulatory moisture is derived. Its waters are drawn up as vapors by evaporation and carried great

distances by the winds. They then condense and fall as rain or snow, some back into the sea, the remainder upon the land which they nourish, finally returning to the sea as rivers. See RIVER; also articles on the oceans.

Ocean Grove, N. J., a city and noted summer resort of Monmouth Co., about 60 m. s. of New York City and 7 m. s. of Long Branch, on the Atlantic Ocean and on the Pennsylvania and the Central of New Jersey railroads. It is directly south of Asbury Park and separated from it by Wesley Lake. Ocean Grove is on a splendid beach. It is characterized by rigid religious observances, due to its management by a Church organization, as it is controlled by a camp-meeting association of the Methodist Church. There are many fine hotels for summer guests, which frequently number 60,000, an auditorium, temple, etc. Permanent population in 1920, 1,581.

Ocelot, *O' se lot,* or **Leopard,** *Lep' erd,* **Cat,** a spotted member of the Cat Family, usually living in tropical America but found as far north as Oklahoma. It is about one-half the length of the leopard but is nearly as tall, and is very active and cruel. It makes its home in dense thickets, generally crouching upon the limb of a large tree, along which it creeps cautiously toward its unsuspecting prey. Its color is grayish but spotted with black-rimmed, fawn-colored spots irregular in form, and not only differing in different animals but on the two sides of the same one. The fur is soft and very valuable.

Ocher, *O' ker,* a class of mineral pigments consisting chiefly of oxide of iron and varying in color from yellow to red. The color is modified by the presence of manganese, which produces brownish varieties known as sienna and umber, and by burning. Raw sienna, a brownish-yellow, becomes after burning a rich russet-brown, known as burnt sienna; raw umber, a dead brown, takes on a reddish tinge when reduced to a powder by heating. These, together with yellow ocher, which has a soft, mellow tone, are among the standard pigments used by artists. The color is prepared for the market by being freed from all impurities, dried, ground and mixed with oil. Ocher occurs in various parts of the United States, in France, Germany and Italy. The finest quality comes from Oxford, England. See PAINT; PIGMENTS.

Ocmulgee, *Ok mul' gee,* **River,** a river of Georgia. It is formed by the union of three small streams, flows southeast and unites with the Oconee to form the Altamaha. Its length is about 280 m., and it is navigable for small vessels to Macon.

Oconee, *O ko' nee,* **River,** a river of Georgia. It rises in the northeastern part of the state, flows southward and unites with the Ocmulgee to form the Altamaha. It is about 270 m. long.

O'Con'nell, Daniel (1775-1847), an Irish orator and political agitator, born in County Kerry and educated at Cork and in the colleges of Saint-Omer and Douai, France. Admitted to the Irish bar, he early advocated Catholic emancipation, and, though in 1828 he could not take a seat in Parliament, as he could not subscribe to the Test Act, the following year he triumphed with the carrying through of the measure of Catholic Emancipation. Thereafter he continued in Parliament till his death. In 1843 he was convicted, though soon pardoned, for agitating throughout Ireland the repeal of the Union.

O'Con'nor, Thomas Power (1848-), an Irish journalist and Parliamentarian, born at Athlone, Ireland. He was educated at the College of the Immaculate Conception in his native town, and at Queen's College, Galway. He began his journalistic work on th *Dublin Press,* and after that was connected with some London journals. In 1880 he became a member of Parliament and toured the United States the year following, attending the Irish-American Convention and lecturing on Irish questions. He was made president of the Irish National League of Great Britain in 1883; served in Parliament from 1885 to 1906, being reelected in 1906;

and founded and edited the *Star*, the *Sunday Sun*, the *Sun*, *M. A. P.* and *T. P's Weekly*. Among the books published by him are *Lord Beaconsfield: A Biography; The Parnell Movement; Gladstone's House of Commons;* and *Napoleon.*

Octave, *Ok' tave,* **Than'et.** See FRENCH, ALICE.

Octa'via, sister of Octavius, later the Emperor Augustus, and wife of Mark Antony. Shortly after the death of her first husband, Claudius Marcellus, she married Antony to secure reconciliation between him and her brother, but in a few years she was forsaken for Cleopatra. In 35 B. C. she made an effort to rescue her husband from his shame, but he not only spurned her but later secured a divorce. To Antony, Octavia was patiently faithful till her death, 11 B. C., devoting herself to the care of his children.

October, *Ok to' ber,* the tenth month of the year, containing 31 days. The name comes from the Latin word for eight, as this was the eighth month of the old Roman year. When the calendar was changed by the adding of January and February, the name of October remained unchanged, although it became the tenth month. The Roman festival in which a horse called October was sacrificed to the god Mars, fell in this month. See CALENDAR; MONTH; YEAR.

Octopus, *Ok' to pus,* a family of Cephalopods having eight tapering arms. The head is separated from the globular body by a distinct neck, and bears two prominent eyes. The arms of the octopus encircle the mouth and are, in some species, connected by a web. All of the arms bear rows of sucker disks, which lack the horny rim possessed by many Mollusks. The two long tentacles borne by the true cuttlefish are lacking in this family, although in the United States the octopus is frequently spoken of as the cuttlefish. In the waters of the Mediterranean, West Indies and China the octopus grows to a large size, frequently having arms five feet in length; as it lurks in crevices of the rocks, it is a dangerous enemy since its movements are rapid and the strength of its arms powerful. The natural food of the octopus consists of crabs and lobsters, which are found in great numbers near its haunts. See CUTTLEFISH; CEPHALOPODA.

Odd Fellows, Independent Order of, a fraternal order representing one of the largest social institutions in the world. It was founded in Manchester, England, in 1813, and introduced into the United States in 1819. In the latter country the membership is about 1,250,000. The headquarters of the American lodges are in Baltimore, Md. The membership in Canada exceeds 200,000. The corresponding order for women is the Rebekah degree.

Ode. See POETRY, subhead *Ode.*

O'der, a river of Germany. It rises among the Sudetic Mountains in Moravia, flows northwest and falls into the Baltic Sea through the Stettiner Haff. Its length is 562 m. Navigation of its shallow waters is uncertain in dry seasons. The Warthe is an important tributary. The principal towns on the banks of the Oder are Stettin, Frankfort-on-the-Oder, Breslau and Oppeln.

Odes'sa, a seaport of Russia, situated on the Black Sea, by rail 1017 m. s.w. from Moscow. Steep crags form a descent to the sea, and underneath the town are the catacombs formed by the removal of sandstone for building purposes. The city is distinctly West-European, modern and wealthy. Among important buildings are the Cathedral, the royal palace, several mansions, the university, the town theater and the municipal library. Odessa is becoming a popular summer bathing resort. It is the chief seaport of Russia, and in population and trade ranks next to St. Petersburg, Moscow and Warsaw. The large corn trade brings in a great number of laborers, estimated at 35,000, who are forced to lie idle when the busy season is over and resort to the catacombs in their dire poverty. Grain, especially wheat, is the chief export. Other exports include wool, hemp, flax, timber,

iron and coal. The principal industries are oil mills, paper factories, chemical works, sugar refineries and tin-plate works. Odessa was founded in 1794, and has been the scene of violent revolutionary disorders. Population in 1909, 478,900.

O'din, or **Wo'den,** in myths, highest Norse god, all-powerful ruler of the universe and progenitor of all other divinities. His throne in Asgard, the residence

ODIN

of the gods, overlooked the world, of which his two ravens daily furnished him minute tidings. In Walhalla, where he presided as war god, he sumptuously entertained by feasting and fighting the fallen heroes conducted thither by his messengers, the Valkyries. Odin was represented as a vigorous man of about 50, clad in a long robe of blue and gray, representing the sky with its clouds. He carried the spear by which inviolable oaths were sworn, and wore the ring of fruitfulness. About him were his ravens and wolves. The word *Wednesday* came from Woden.

Odoacer, *O" do a' ser,* (about 434-493), the first barbarian ruler of Italy, supposed to have come from the middle Danube region. He led a revolt in 476, deposed the Emperor Romulus Augustulus, and assumed the royal power. The Ostrogoths under Theodoric invaded Italy in 489, and Odoacer was defeated in three battles. Later he was treacherously slain.

Odyssey, *Od' i sy.* See ILIAD.

Œdipus, *Ed' i pus,* the hero of a Theban legend and the son of Laius, King of Thebes. Laius had been warned by the oracle at Delphi that he was to die at the hands of his son. When Œdipus was born he was given to a herdsman to be exposed on Mt. Cithæron. The herdsman, however, gave the child to Polybus, King of Corinth, by whom he was brought up. When a young man, Œdipus learned that he was not the son of Polybus, and sought the oracle at Delphi to learn his parentage, but he did not obtain the desired information. However, he was told that he was doomed to slay his father. He fled from Corinth and on his way to Thebes met Laius, whom he killed in an encounter, being ignorant, of course, of his identity. He found Thebes in a turbulent condition because of the Sphinx, who propounded a riddle to all who entered the city's gates and devoured those who failed to solve the riddle. Creon, a brother of Jocasta, who was the mother of Œdipus, was king, and he had offered the hand of Jocasta and the kingdom to anyone who would solve the riddle and kill the Sphinx. Œdipus solved the riddle, killed the Sphinx and married Jocasta, not knowing that she was his mother. For several years he was happy and prosperous. Four children, two sons and two daughters, were born to him and Jocasta. Finally he was made aware of his condition and was so overpowered with remorse that he put out his eyes. Jocasta hanged herself and Œdipus was expelled from Thebes. His faithful daughter, Antigone, was his constant companion in his years of wandering, until he bade her farewell and entered a dense forest from which he never returned. See ANTIGONE.

Offenbach, *Of' en bahk,* **Jacques** (1819-1880), a composer of French comic opera, born at Cologne, of German-Jewish parents. Beginning as a cellist in orchestra, he soon became con-

ductor in the French Theater at Paris. He produced some 69 operatic works. His operas are marked by a strain of coarseness, but are gay and vivacious. Notable among them is *The Grand Duchess of Gérolstein*. *The Tales of Hoffmann*, produced in 1881, also won popular favor.

Ogden, Utah, a city and county seat of Weber Co., 35 m. n. of Salt Lake City, on the Ogden River, at the western base of the Wasatch Mountains, and on the Southern Pacific, the Union Pacific, the Denver & Rio Grande and the Oregon Short Line railroads. Ogden is well built and has a modern electric street-car and interurban system. The city has an elevation of 4300 ft. above sea level and has extensive mining, agricultural, horticultural and live-stock interests. In importance as a commercial and railway center, Ogden is second in the state to Salt Lake City. The entrance to the noted Ogden Canyon is near the eastern limits of the city. Here are located natural hot springs, famed for medicinal properties, and a large sanatorium. The Oaks, Hermitage and the Idlewild are among the popular places of the canyon for entertainment of tourists.

Among the noteworthy buildings of Ogden are the courthouse, city hall, Federal Building, a Carnegie library, Tabernacle, city hospital, Masonic Temple and a large number of churches. The public parks and excellent waterworks are owned by the city. The educational institutions include a state industrial school, state school for the deaf and blind, two business colleges, the Weber and Sacred Heart academies, public schools, a Mormon school and a high school which cost $100,000. In the stock industry Ogden is important as a shipping and packing center, the packing houses being among the most modern in the West. Over $1,000,000 is also invested in the canning industry, and fruits and vegetables are canned in large quantities. There are large deposits of salt, clay, cement, coal and iron near the city. Ogden is said to have been named in honor of John Ogden, a hunter and trapper. In 1850 the place was laid out under the direction of Brigham Young. Since 1898 the city has been governed under a general law of the state. Population in 1920, 32,804.

Ogdensburg, *Og' denz burg,* **N. Y.,** a city and port of entry of St. Lawrence Co., 137 m. n.e. of Syracuse and 142 m. n. of Rome, on the St. Lawrence River at the mouth of the Oswegatchie, and on the New York Central & Hudson River and the Rutland railroads. Ogdensburg, as the terminal of deep-water navigation on the Great Lakes, has steamer connection with the principal lake ports. The St. Lawrence River at this point is over a mile wide and is crossed from Ogdensburg by steam ferryboats plying between this city and Prescott, Ontario. Among the prominent educational and charitable institutions are the St. Lawrence State Hospital, Northern New York General Hospital and United Helpers' Home. It has also a fine customshouse, state armory and several parks. Its manufactured products include lumber, flour, brass goods, boilers, leather, silks, etc. It was chartered as a city in 1868. Population in 1920, 14,609.

Oglesby, *O' g'lz by,* **Richard James** (1824-1899), a United States senator, born in Oldham County, Ky. He removed to Illinois at the age of 12. In 1845 he was admitted to the bar. From 1849 to 1851 he was engaged in mining in California, after which he returned to Decatur, Ill., where he had previously lived. He was elected to the State Senate in 1860, but soon resigned to enter the Union army, serving at Ft. Henry, Ft. Donelson, Shiloh and Corinth. He retired from the army in 1864 with the rank of major-general of volunteers. The same year he was elected governor of Illinois, which position he occupied until 1869, and was again elected in 1872. He was United States senator from 1873 to 1879, and served again as governor of the state from 1884 to 1889, after which he retired to private life.

Oglethorpe, *O' g'l thorp,* **James Edward** (1696-1785), an English soldier and reformer who founded the State of

Georgia, was born in London, of ancient family. On leaving Oxford, he entered the army, participating in the defeat of the Turks at Belgrade. In 1722 he inherited the family estate and entered Parliament, where he was chairman of a commission which investigated imprisonment of debtors. As a result of disclosures, Oglethorpe secured a grant of land between the Savannah and the Altamaha rivers in Georgia, where he planned to establish a colony for debtors and for worthy poor. On Nov. 17, 1732, he and a band of 130 landed at Charleston. They settled Savannah in 1733 (See GEORGIA, subhead *History*). As governor of the colony, Oglethorpe demanded obedience, although he ruled with great tact and liberality. He led several expeditions against the Indians and Spanish, in May, 1740, moving upon St. Augustine, and in June, 1742, freeing Georgia from all danger of Spanish conquest. In 1743 he went to England, never to return. He there became a brigadier-general. In 1752 he and the other trustees resigned their Georgia charter, and the colony became a royal province.

O'Ha'gan, Thomas (1855-), a prominent poet, essayist and journalist, born near Toronto, Canada, and educated at Ottawa, Syracuse and other universities. He entered the teaching profession in 1874, being head of various Roman Catholic separate schools and language master in several Ontario high schools. Besides lecturing widely, Dr. O'Hagan has contributed prose and verse to such publications as the Toronto *Globe,* the *Canadian Magazine, The Rosary,* the *Boston Pilot,* the Milwaukee *Citizen* and the Chicago *New World.* He became chief editor and director of the *New World* in 1910. His works include *A Gate of Flowers, Songs of the Settlement, Studies in Poetry* and *Essays, Literary, Critical and Historical.*

O. Henry. See PORTER, SYDNEY.

Ohi'o, THE BUCKEYE STATE, one of the East North Central States, is bounded on the n. by Michigan and Lake Erie, on the e. by Pennsylvania, on the s.e. by West Virginia, on the s. by Kentucky and on the w. by Indiana. The Ohio forms the southeastern and southern boundaries.

SIZE. The greatest length from north to south is 210 m. and from east to west, 225 m. The area is 41,040 sq. m., of which 300 sq. m. are water. Ohio is a little larger than Kentucky and a little smaller than Tennessee or Virginia, about one-half the size of Minnesota and the 35th state in area.

POPULATION. In 1920 the population was 5,759,394. From 1910 to 1920 there was a gain in population of 992,273, or 20.8 per cent. There are 141.4 inhabitants to the square mile and the state ranks fourth in population.

SURFACE. A low ridge forming a watershed, or divide, extends in an irregular line from the northeastern corner of the state to the middle of the western boundary. North of this line the surface is low and generally level, and slopes gently toward Lake Erie. Much of the larger part of the state is south of this divide. The surface in this portion is more rolling and broken, the higher lands being cut through by the Muskingum, Scioto and other rivers, forming large, deep valleys. This region contains some elevations from 1000 to 1500 ft. above sea level, and the highest point, near Bellefontaine, a little west of the center, has an altitude of 1541 ft. The lowest land is in the Valley of the Ohio near Cincinnati. The average elevation of the state above the sea is 850 ft.

RIVERS AND LAKES. The divide separates the state into two drainage basins, one including the rivers flowing into Lake Erie and the other those flowing into the Ohio. The Ohio, forming the southern boundary, has a frontage on the state of 436 m. It receives the Muskingum, the Hocking, the Scioto, the Little Miami and the Great Miami. The Muskingum is the largest river wholly within the state. The main streams flowing into Lake Erie are the Grand, the Cuyahoga, the Sandusky and the Maumee. These rivers have broad estuaries at their mouths.

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1. Buckeye
2. Fruit
3. Lake Commerce
4. Ore & Coal Docks
5. State Flower
6. Blast Furnace
7. Farming
8. Coal Mining
9. Sheep and Hogs
10. Stockyards
11. Implement Mfg.
12. Potteries
13. Tobacco Warehouse
14. Oil Wells

Lake Erie has a frontage of about 236 m. along the level and on its shores are a number of good harbors. In Summit County are several small lakes noted for the beauty of their scenery.

Climate. Ohio has a mild temperate climate, though it is subject to extremes in temperature. These are, however, of short duration. There is a marked difference in temperature between the northern and southern parts of the state. In the north the winters are longer and colder and the summers are cooler, owing to the influence of Lake Erie. The lake shores are very pleasant and contain a number of popular summer resorts. The mean temperature of the state for July is 73° and for January, 26°. The average annual rainfall is 39½ inches.

Minerals and Mining. The bituminous coal fields of Ohio have an area of over 1000 sq. m., most of them being in the eastern part of the state. Coal mining is one of the most important mineral industries. There are coal mines in 29 counties. The production of petroleum is also very important. Ohio has two oil fields, one in the eastern part and another in the northwestern; the latter, known as the Lima Field, is one of the most important fields in the United States. Natural gas is found in large quantities in the east-central and northwestern parts of the state. Cuyahoga and Lorain counties contain quarries of the best sandstone in the United States. From a sandstone known as Berea grit most of the grindstones and stones used in the manufacture of wood pulp in the country are obtained. Limestone is quarried for flux, a building and smelting ore, and for the manufacture of quicklime and cement. Ottawa County contains a large bed of gypsum. Iron ore is found in several localities, but is not extensively worked because of the mines in the Lake Superior district. Clay suitable for brick, tile and pottery is widely distributed.

Forests and Lumber. Much of the land formerly covered with forests has been cleared and converted into farms. However, large forests containing sufficient quantities of maple, oak, chestnut, cedar and pine to make the manufacture of lumber and lumber products a thriving industry, still remain.

Agriculture. Ohio is one of the leading agricultural states. Over 94 per cent of the land is in farms, and over 78 per cent of the farm land is under tillage. The suitable climate, fertile soil, abundant rainfall and the location within the state of excellent markets are all favorable to agricultural interests. The farms are small, averaging less than 90 acres, and about three-fourths of them are tilled by their owners.

Soil. Over a large part of the state the soil was formed by deposits of drift, and nearly all of it is fertile. Along the rivers the soil is alluvial and in the northwestern portion it is clayey.

Products. There is a great variety of products, but corn, wheat, oats, hay, potatoes, apples and tobacco are the principal crops. Most of the corn and wheat is raised in the western part of the state, and the northwestern counties are best for oats. The southwestern counties raise most of the tobacco. Apples, peaches, pears, grapes and small fruits are raised in abundance, and growing vegetables for the markets of Cleveland, Cincinnati, Toledo and other large cities is an important industry.

Excellent pasturage is found in all parts of the state, and raising live stock is a valuable source of income. Horses, cattle, sheep and hogs are raised in large numbers, and Ohio is an important state in the production of wool. Dairying is a leading branch of animal husbandry and the annual income from dairy products is about $15,500,000. Poultry is also an important source of revenue in nearly all parts of the state.

Manufactures. Ohio is one of the leading manufacturing states. It is first in the manufacture of wagons and carriages and of pottery and clay products, and second in the manufacture of agricultural implements and prepared foods. Next in order are the manufacture of flour and gristmill products, roasting and

grinding coffee and the preparation of spices, making machinery and castings and the manufacture of scales, soap, candles, tobacco, cigars, cigarettes, boots and shoes, rubber goods, automobiles, cash registers, clothing, paper, brick and tile and paints. The chief manufacturing centers are Cleveland, Cincinnati, Youngstown, Toledo, Columbus, Springfield, Dayton and Akron.

Transportation and Commerce. The state is well provided with water communication. The Ohio connects it with western Pennsylvania and the Mississippi. The Muskingum is navigable for about 400 m. There are numerous good harbors on Lake Erie, and through this lake and the Erie Canal water connection with the Atlantic is secured. These harbors have determined the location of Cleveland, Sandusky, Toledo and other lake ports. Coal, iron, lumber and other heavy freight are as far as possible carried over the water routes.

Ohio has about 10,000 m. of railways, which extend throughout the state in all directions. The most important systems are the New York Central, which includes the Lake Shore & Michigan Southern, the Pennsylvania, the Baltimore & Ohio, the Big Four (Cleveland, Cincinnati, Chicago and St. Louis), the Erie, the Hocking Valley and the Toledo & Ohio Central. There is also a network of interurban electric lines which greatly facilitate travel. Throughout the state there are excellent transportation facilities.

The state has an extensive commerce, a good part of which consists in the interchange of products between the manufacturing centers and the farming communities. Cleveland, Cincinnati, Toledo and Ashtabula are important ports for the transshipment of goods brought from other states. In the lake ports the transshipment of iron ore and coal is especially heavy. Farm produce, coal and the various manufactured products are sent to other states and some manufactures reach foreign lands. Raw material for manufacture, some foodstuffs and some manufactured goods are imported. Cleveland, Cincinnati and Toledo are the chief railway and commercial centers.

Government. The present constitution was adopted in 1851, but has been amended several times, the last time in 1912. The Ohio Constitutional Convention of 1912, during a session of five months, ending in May, adopted 42 amendments which were submitted to the people for a referendum vote in September. Thirty-four of these amendments were adopted at that election. Ohio's constitution as amended is distinctly progressive in character. Greater powers were conferred on the Legislature in respect to the control of corporations, labor laws, the levying of progressive-inheritance and income taxes, and the protection of the natural resources of the state. The people of cities, however, were empowered to frame their own charters. Provision was made for the initiative and the referendum, and for the minimum wage and workmen's compensation.

The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer and attorney-general, each of whom, with the exception of the auditor, is elected for two years. The auditor is elected for four years; the superintendent of public instruction is appointed by the governor for four years, and members of the board of public works, for two years. The Legislature consists of a Senate and House of Representatives, the members of both houses being elected for two years. The Legislature meets biennially.

The judicial department consists of a Supreme Court, Courts of Appeals, Courts of Common Pleas, Probate Courts and such inferior courts as may be established by law. The judges of the Supreme Court are elected by popular vote for not less than six years. The state is divided into appellate districts, in each of which there is a Court of Appeals, consisting of three judges, whose terms of office are six years.

Education. The schools are among the best in the country, and are under

the charge of a state superintendent of public instruction. Ohio was the first state to derive benefit from the public school lands set apart in the Northwest Territory by the Ordinance of 1787. (See Ordinance of 1787). The schools are well organized, thoroughly equipped and taught by trained teachers. It was in Ohio that the movement for consolidating the rural schools was inaugurated and carried forward with remarkable success. The higher institutions under control of the state are the Ohio State University at Columbus; Miami University at Oxford; Ohio University at Athens; and Wilberforce University at Wilberforce; and the State Normal Schools at Kent and at Bowling Green.

The most important institutions of learning not under control of the state are Oberlin College at Oberlin; Marietta College at Marietta; Ohio Wesleyan University at Delaware; St. Xavier College at Cincinnati; Western Reserve University at Cleveland; Denison University at Granville; Hiram College at Hiram; University of Wooster at Wooster; Wittenberg College at Springfield; Otterbein University at Westerville; Kenyon College at Gambier; Heidelberg University at Tiffin; the municipal University of Akron, the University of Cincinnati and the Case School of Applied Science; the latter is located at Cleveland.

State Institutions. The hospitals for the insane are at Athens, Cleveland, Columbus, Dayton, Longview and Toledo. The schools for the blind, the deaf and the dumb, and the feeble-minded are at Columbus. The soldiers' home is at Dayton and the soldiers' and sailors' home at Sandusky. The state penitentiary is at Columbus and the state reformatory at Mansfield. There are also state industrial schools for boys and girls at Lancaster and Marysville.

Cities. The chief cities are Columbus, the capital; Cleveland, Cincinnati, Toledo, Dayton, Youngstown, Akron, Springfield, Canton, Zanesville and Sandusky.

History. Ohio, the name of which is the Senecas' expression "How beautiful!" and which was applied to the Allegheny-Ohio River, was first seen by Joliet in 1669. French fur-trading stations were soon built about Maumee City, at Sandusky and at Cuyahoga; but all French claims were surrendered to the English in 1763. In 1787, by Manasseh Cutler, Rufus Putnam and other New England veterans of the Revolution, the Ohio Company was formed. For $1,000,000 it bought from the government a tract of 1,500,000 acres lying northwest of the Ohio River. This, the first public sale of land by the government, led to framing the Ordinance of 1787.

In 1788 settlements were made at Marietta and Cincinnati. In 1796 Cleveland was founded. Wayne's victory at the Battle of the Maumee, 1794, caused the Treaty of Greenville, whereby the defeated Indians granted to the United States nearly all Ohio with sections of Indiana and Michigan. Danger from the Indians being removed, settlements sprang up rapidly. Dayton was founded in 1796, as was Chillicothe, where in 1799, the first Legislature met and sent William Henry Harrison to Congress. Ohio adopted a constitution in 1802 and on Feb. 19, the following year, it became a state. In 1811 the first steamboat, the *Orleans*, came down the Ohio from Pittsburgh. The state was prominent in the War of 1812, and, for the Civil War, furnished about 320,000 men besides many famous generals, including Sherman and Sheridan. As Ohio was in the direct path of Western immigration, it developed rapidly. Consult Rufus King's *Ohio* in the American Commonwealths Series.

Governors. Edward Tiffin, 1803-1807; Thomas Kirker, 1807-1809; Samuel Huntington, 1809-1811; Return Jonathan Meigs, 1811-1814; Othniel Looker, 1814-1815; Thomas Worthington, 1815-1819; Ethan Allen Brown, 1819-1822; Allen Trimble, 1822-1823; Jeremiah Morrow, 1823-1827; Allen Trimble, 1827-1831; Duncan McArthur, 1831-

1833; Robert Lucas, 1833-1837; Joseph Vance, 1837-1839; Wilson Shannon, 1839-1841; Thomas Corwin, 1841-1843; Wilson Shannon, 1843-1844; Thomas W. Bartley, 1844-1845; Mordecai Bartley, 1845-1847; William Bebb, 1847-1849; Seabury Ford, 1849-1851; Reuben Wood, 1851-1853; William Medill, 1853-1856; Salmon P. Chase, 1856-1860; William Dennison, Jr., 1860-1862; David Tod, 1862-1864; John Brough, 1864-1865; Charles Anderson, 1865-1866; Jacob D. Cox, 1866-1868; Rutherford B. Hayes, 1868-1872; Edward F. Noyes, 1872-1874; William Allen, 1874-1876; Rutherford B. Hayes, 1876-1877; Thomas L. Young, 1877-1878; Richard M. Bishop, 1878-1880; Charles Foster, 1880-1884; George Hoadley, 1884-1886; Joseph B. Foraker, 1886-1890; James E. Campbell, 1890-1892; William McKinley, Jr., 1892-1896; Asa S. Bushnell, 1896-1900; George K. Nash, 1900-1904; Myron T. Herrick, 1904-1906; John M. Pattison, 1906; Andrew Lintner Harris, 1906-1909; Judson Harmon, 1909-1913; James M. Cox, 1913-1915; Frank B. Willis, 1915-1917; James M. Cox, 1917-1921; H. L. Davis, 1921—.

Ohio and Erie Canal. See CANAL.

Ohio Company, an organization authorized by Congress in 1787 at the solicitation of Rufus Putnam and others, and having for its purpose the forming of settlements in what is now the State of Ohio. A large tract of land was purchased from the government on very liberal terms, and settlers were induced to enter the new country. The company was largely instrumental in securing the passage of the Ordinance of 1787 for governing the Northwest Territory. See ORDINANCE OF 1787; OHIO, subhead *History*.

Ohio River, a large river of the United States, formed by the Allegheny and the Monongahela, which unite at Pittsburgh, Pa. The Ohio flows westward and southwestward. It forms the boundary between Ohio and West Virginia, and between Ohio, Indiana and Illinois, and Kentucky, and enters the Mississippi at Cairo, Ill. It is about 1000 m. long, and it drains an area of about 200,000 sq. m. During the open season it is navigable for large steamers to Pittsburgh, except in times of low water. Rapids near Louisville obstruct navigation and boats pass around them in a canal. The chief tributaries from the north are the Muskingum, Scioto, Miami and Wabash, and from the south the Great Kanawha, Big Sandy, Licking, Kentucky, Green, Cumberland and Tennessee. The Ohio is subject to great variations in level, the difference between high and low water sometimes being 50 ft. or more.

Ohio, State Universities of. Ohio has three state universities, located and chartered as indicated below. State normal schools were maintained at Athens, Miami, Kent and Bowling Green.

OHIO UNIVERSITY, at Athens, was chartered in 1804 and opened in 1809. For its support two townships of land were set aside in 1787. Its annual receipts, including state appropriations, are about $350,000. It maintains a collegiate department, a normal school and schools of music and commerce. The library contains some 47,000 volumes and there are about 4000 students.

MIAMI UNIVERSITY, at Oxford, was chartered in 1809 and college work was begun in 1824. A township of land, ceded by Congress to the state, was the nucleus of its endowment. Its first class of 12 members graduated in 1826. Its annual receipts, including state appropriations, are about $250,000. There are collegiate and normal departments. The library includes about 56,000 volumes and the students number approximately 900, with as many more in the summer school.

OHIO STATE UNIVERSITY, at Columbus, chartered in 1870, was opened in 1873 as the Ohio Agricultural and Mechanical College. Five years later it was reorganized under its present name. Its site includes over 782 acres, of which 600 are for the experimental work in agriculture. It maintains eleven colleges —art, agriculture, dentistry, education, philosophy and science, commerce and

journalism, homeopathic medicine, medicine and a graduate school, engineering, law, pharmacy and veterinary medicine. It has a library of 184,268 volumes and about 6000 students.

Ohm, *Ome,* the unit which measures the resistance of a body to conducting an electric current. It is the same as the resistance offered at the freezing point of water by a column of mercury 106.3 centimeters long and having a cross section one square millimeter in area. The British ohm and the Paris legal ohm differ slightly from this but are not now in general use, the one above defined being the international ohm. The ohm was named after Prof. G. S. Ohm, a German investigator of electrical phenomena.

Ohm, Georg Simon (1787-1854), a noted German physicist, born at Erlangen, Germany, and educated in his native town. He taught mathematics and physics in several schools, and in 1817 became professor at Cologne. He gave particular attention to the relative conducting power of various metals, and discovered Ohm's Law, by which electric currents are now universally measured. He was director of the Nuremberg Polytechnic School from 1833 to 1849, and went from there to the chair of physics at Munich.

Ohm's Law, an important law of electricity which shows the relation of the current, the resistance to the current and the electromotive force. It states that the strength of the current increases and decreases with the electromotive force, but varies inversely as the resistance. In mathematical form the current in amperes is equal to the electromotive force in volts divided by the resistance in ohms. This law was first stated by Professor Ohm of the University of Munich.

Oil City, Pa., a city of Venango Co., 132 m. n.e. of Pittsburgh and 18 m. from Titusville, on the Allegheny River, at the mouth of Oil Creek, and on the Erie, the Pennsylvania and the Lake Shore & Michigan Southern railroads. Oil City is one of the principal petroleum markets in the Pennsylvania oil regions, immense quantities of this commodity being bought and sold here. The town was settled in 1825, but did not become of any particular importance until 1860, when oil was first discovered in Oil Creek Valley. The city contains extensive oil refineries, oil-well supply factories, machine and boiler shops and manufactories of spokes and handles, explosives, tubes and tanks. The Allegheny River divides the city into two parts which are connected by several bridges. Oil City was incorporated as a borough in 1863 and in 1874 it received a city charter. Population in 1920, 21,274.

Oilcloth. See LINOLEUM.

Oils, thick, sirupy substances, liquid at ordinary or slightly higher temperatures. They are characterized by being lighter than water, in which they cannot be dissolved. Oils are classed, according to their sources, as animal, vegetable or mineral oils. Most of the oils of mineral origin are merely compounds of hydrogen and carbon, but vegetable and animal oils generally contain oxygen and sometimes other elements, as sulphur and nitrogen. The mineral oils are chiefly coal-tar products (See KEROSENE; GASOLINE; NAPHTHA; PETROLEUM). Familiar animal oils are sperm oil, cod-liver oil, goose oil, etc.

According to their actions, oils are classed as fatty, or fixed, and volatile, or essential, oils. The fatty oils are those which leave a permanent greasy stain and cannot be distilled without change of composition. These oils are found in animal fats. Volatile oils are those which vaporize easily and which, being commonly found in plants, give to plants their characteristic tastes and odors. Such oils are oil of wintergreen, mustard oil, oil of cloves, etc. They are frequently used in perfumes and as flavoring in foods. Oils, on being distilled, frequently give up gas which is used for heating or lighting purposes, and many are used in liquid condition as fuel.

Ojib'way (Ojibwa), or **Chippeway,** a tribe of North American Indians living

in regions surrounding lakes Huron and Superior. They were strong in numbers and belonged to the Algonquian family. There are now about 30,000 on reservations in the same region. After the War of 1812 they were friendly to the whites. They subsist chiefly on game.

Okapi, *O kah' pe,* a little-known animal of the Giraffe Family found in the densest forests of Africa. Its discovery, which occurred as recently as 1899, came about when exploring parties penetrated the forests of Uganda and found the ponylike animal with red-brown body, which the Pygmies called the okapi. The fore and hind limbs are white, marked with brown, horizontal stripes; its cheeks are yellowish-white and its nose and muzzle are brown. It has pointed ears, a somewhat elongated neck and a sloping body, which gives the forelegs the same appearance of length as have those of the giraffe. The male has backward-curving, giraffelike horns, but the female is hornless.

Okechobee, *O ke cho' bee,* a lake in the southern part of Florida. It is 40 m. long and about 25 m. wide and is the largest lake in the Southern States. It is shallow, being only 20 ft. deep, and is bordered by cypress swamps. Lake Okechobee is in the midst of the great swamp known as the Everglades, through which it finds an outlet to the sea.

Okhotsk, *O kotsk',* **Sea of,** a large arm of the Pacific Ocean indenting the east coast of Asia between the Peninsula of Kamchatka on the north and the Siberian coast on the south. The long chain of the Kurile Islands, a Japanese possession, forms its separation from the Pacific, while the Island of Sakhalin, partly Russian and partly Japanese, separates it from the Japan Sea. The Amur is the chief river flowing into it, and the seaports along its shores, once well known, are now of little importance. Its greatest depth is 2100 feet.

O"klaho'ma, THE BOOMER STATE, one of the West South Central States, is bounded on the n. by Colorado and Kansas, on the e. by Missouri and Arkansas, on the s. by Texas and on the w. by Texas and New Mexico. The Red River forms a large part of the southern boundary.

SIZE. The length from east to west not including the Panhandle is 310 m. The length of the eastern boundary is 213 m. and of the western boundary, 170 m. The area is 70,057 sq. m., of which 643 sq. m. are water. It is larger than any of the states east of the Mississippi River. Oklahoma is almost the exact size of North Dakota and a little smaller than Ohio and Indiana combined. It could contain all the New England States and Delaware, and is the 17th state in area.

POPULATION. In 1920 the population was 2,028,283. From 1910 to 1920 there was a gain in population of 371,128, or 22.4 per cent. There are 29.2 inhabitants to the square mile and the state's rank in population is 21. The population here given includes what was included in Oklahoma and Indian Territory in the census of 1900.

SURFACE. The surface in general is that of a rolling plain sloping gently to the southeast, but this plain is naturally divided into several surface regions. That part of the state north of the Canadian and Arkansas rivers has its surface deeply cut by the rivers flowing through it. In the central part of this region is a broad extent of open prairie.

The Ozark Mountains enter the state through the east about midway between the northern and southern boundaries and extend in a southwest direction nearly halfway across it. The Wichita Mountains extend in a southeast direction across the southwest corner, lying chiefly in Beckham, Greer, Kiowa and Comanche counties. These mountain ranges and their spurs give the southern part of the state a somewhat hilly and rolling surface, though they are not high mountains, the highest peaks not exceeding 1500 ft. The extreme northwestern part of the state is an elevated, rolling plateau which belongs to the Great Plains. The highest altitude, 4700 ft., is

in the northwestern, and the lowest point, 315 ft., is in the southeastern corner of the state. These mountains constitute a connecting link between the Ozark Mountains of Arkansas and Missouri and the Rocky Mountains.

Rivers. The state is well watered by streams. Ten rivers cross Oklahoma. All the drainage is into the Mississippi through the Arkansas or the Red River. The chief tributaries of the Arkansas are the Grand, Verdigris, Poteau, North Canadian, South Canadian, Cimarron and Salt Fork. The tributaries of the Red include the Kiamichi, Blue and Washita. The general course of these streams is from northwest to southeast across the state. These streams are not navigable.

Climate. Oklahoma has a warm climate, but there is a marked contrast between the temperature of the western and of the eastern end of the state. The mean annual temperature of Oklahoma City, which is in the central part of the state, is 59°, with an average of 78° for summer and 38° for winter. The northwestern part of the state is cooler and drier than the other portions. The highest temperature ever recorded is 104°; the lowest, 17° below zero. The average rainfall for the entire state is about 38 inches, but it is much heavier in the eastern than in the western part. The cold season is short. The rivers tend to increase the moisture, so that the climate on the whole is suitable for agriculture in all parts of the state.

Minerals and Mining. The bituminous coal fields have an area of about 20,000 sq. m. and extend from the Kansas border southward nearly across the eastern end of the state. The most important mines are in Coal, Latimer and Pittsburg counties. The annual output is about 3,500,000 tons. Petroleum was discovered on the border of Indian Territory in 1890, and in 1903 a number of wells were bored in Bartlesville. During the last few years Oklahoma has led the United States in the production of petroleum and in 1911 produced 54,000,000 barrels of crude oil. Natural gas in large quantities is also found in the oil regions. There are extensive deposits of gypsum rock, which is used for cement, stucco and plaster, in a range of hills extending from the central part of the state northwest to the northern boundary. Quarries are worked in Blaine, Kay and Canadian counties. The glass-sand deposits are very important. Southern Oklahoma contains a ledge of glass sand, averaging 50 ft. thick and 60 m. long, which, on analysis, is found to be almost pure silica. There are deposits of asphalt in the central and southern parts of the state along the Canadian River, but they have not yet been extensively worked. Salt plains occur on the Canadian River in Woodward and Woods counties, as well as in Blaine County. Clay, lead, iron, copper and zinc are found in a number of localities. The granite deposits are among the finest in the country. Twenty or more varieties of shades and textures are found. The Wichita Mountains, 1000 ft. high and 60 m. long, in the southwestern part of the state, are composed entirely of granite. The value of the yearly output of all mineral products of the state is about $27,000,000.

Forests and Lumber. There are about 24,000 sq. m. of forests in the state. The larger part of the area is in the eastern section. In the western part forests do not occur except along the streams. The merchantable timber consists of black walnut, hickory, ash, elm, cottonwood, blackjack and pine, and what is locally known as post oak comes from what was formerly Indian Territory and is used to supply local needs. Lumbering is one of the leading manufacturing industries.

Agriculture. Oklahoma is admirably suited by soil and climate for agriculture and it constitutes the chief industry of the state. The average size of most of the farms is 160 acres, but there are many of less than 50 acres and many over 500 acres. Some of the largest farms are owned by Indians who lease them to white men. Practically everything that is cultivated between the

Canadian line and the Gulf of Mexico, and between the Atlantic Ocean and the Rocky Mountains, can be raised in Oklahoma.

Soil. In the east-central part of the state the soil is a clay loam of a dark red color. Along the rivers and in the bottom lands it is a dark alluvium. In each stream valley there is a broad belt of exceedingly fertile bottom land. The upland soil throughout the greater part of the state is also very fertile. In western Oklahoma much of the soil is red, which color is due to the large per cent of iron which it contains. Eastern Oklahoma has large areas of limestone soil.

Products. Corn, cotton and alfalfa are the chief field crops, and in the production of cotton Oklahoma has become one of the leading states. Other important field crops are hay, wheat, oats, kafir corn, sorghum cane, sugar cane, broom corn, castor beans and potatoes. Oklahoma is an excellent fruit state, and large quantities of apples, peaches, pears, plums, cherries and apricots are raised. The number of orchards is increasing each year. Grapes are also raised in large quantities, as are strawberries, raspberries, currants, gooseberries and other small fruits. Garden vegetables are raised in great variety, including cucumbers, melons, tomatoes and sweet potatoes. Pecans, walnuts and other nuts are abundant. Several irrigation projects are in operation in the northwestern part of the state, and as these are extended larger areas will be reclaimed.

Raising live stock is the oldest branch of agriculture in the state and it is still very important. The original breeds of cattle formerly so common on plains have very generally been replaced by breeds of a higher grade, and large numbers of excellent cattle are now found in the state. Horses, mules, hogs and sheep are also raised in large numbers for the Eastern markets. Dairying is an important and growing branch of animal husbandry. The state as a whole also derives a large income from poultry and eggs, and the amount of washed and unwashed wool obtained from the annual wool clip is very great.

Manufactures. The manufacture of flour and gristmill products and of lumber products constitute the leading manufacturing industries. Machine shops, cotton-gin works, foundries and repair shops for railway cars are established in a number of localities to meet local needs. At Oklahoma City are important meat-packing houses. The production of cottonseed oil and oil cake is an important industry in the southwestern part of the state. In those sections settled by Indians are found a number of industries peculiar to those people, such as making baskets, moccasins and beadwork. There are also fruit canneries, brick plants, agricultural-implement shops, salt works, cement and plaster works and flour mills. All of these taken together constitute an industry of fair proportions.

Transportation and Commerce. Trunk lines of railway cross the state from east to west and from north to south. Railway construction has not yet reached some of the western sections, but with this exception, railway facilities are good. Oklahoma City, Guthrie, Muskogee, South McAlester, Enid and Chickasha, Alturs, Shawnee, Hugo, Ardmore are important railway centers.

Oklahoma has a large commerce. Cotton, corn, fruits, vegetables and other agricultural produce, together with live stock, petroleum and gypsum, are exported. The imports consist of manufactured goods, foodstuffs not raised within the state and machinery.

Government. The constitution was adopted in 1907, when Oklahoma became a state. It contains many provisions which in the older states are left to legislative enactment. The executive department comprises the governor, lieutenant-governor, secretary of state, treasurer, auditor, superintendent of public instruction, examiner and inspector, commissioner of labor, commissioner of insurance, chief mine inspector, commissioner of charities and corrections, and president of the board of agricul-

ture, each elected for four years. The governor, secretary of state, auditor and treasurer are not eligible for the next succeeding term.

The Legislature consists of the Senate and a House of Representatives. Senators are chosen for four years, one-half being elected every two years, and representatives are chosen for two years. Legislative sessions are held biennially in the even-numbered years. The referendum applies to legislation, and an act, or any part of an act, may be voted on at a general election when five per cent of the legal voters request that such vote be taken. Legislation may also be initiated by a petition signed by eight per cent of the voters.

The judicial department comprises a Supreme Court, consisting of nine judges elected for six years; a Criminal Court of appeals, consisting of three judges elected by popular vote; 21 District Courts, each with one or more judges elected for four years; a County Court in each county, presided over by a judge elected for two years; and local courts, each presided over by justices of the peace, who are elected for two years. The cities have the usual police and municipal courts. In counties having over 25,000 inhabitants there is now provided a judge of Superior Court.

The state has taken advanced steps in safeguarding its citizens in their possessions of property and their personal rights. Husband and wife are equal in regard to property rights. A homestead of 160 acres of land in the county or one acre in a city, town or village cannot be sold at forced sale, unless it exceeds $5000 in value and providing the claims against it are not for purchase money, improvements or taxes. Public service corporations are under the control of a commission. There is also a state board of arbitration, whose duty it is to investigate lockouts, strikes and other labor troubles. The state maintains a rigid child-labor law, which prohibits the employment of children under 16 years of age in dangerous occupations. Another law forbids public officers to appoint relatives to any government position in a department in which they are in authority.

Education. An excellent public school system is maintained under the direction of the state board of education. This board consists of the state superintendent, who is ex officio chairman, and six members appointed by the governor. Local administration is by county superintendents and district boards, each board consisting of three members. Separate schools are maintained for white and colored children. In addition to instruction in the ordinary branches, instruction is required in agriculture, horticulture, animal husbandry, forestry, road building and domestic science. There are four agricultural schools; the A. & M. College is at Stillwater; the Methodist University at Guthrie; the Oklahoma Baptist University at Shawnee; the Phillips University (Christian) at Enid. Normal schools are maintained at Edmond, Tahlequah, Ada, Durant, Weatherford and Alva. The state university is at Norman and the agricultural college at Stillwater, and at Langston is a normal university for colored youth. Oklahoma City is the seat of the Cary College, Kingfisher College (Congregational) at Kingfisher and the Henry-Kendall College (Presbyterian) at Tulsa, St. Mary's Academy and several conservatories of music. The new high-school building, completed at a cost of $600,000, is one of the most modern buildings of its kind in the United States. The Chilocco Industrial School for Indians is located in Kay County.

State Institutions. The hospitals for the insane are at Fort Supply, Norman and Vinita, the school for the blind at Muskogee; and that for the deaf at Sulphur. The penitentiary is at McAlester, with a branch at Granite. The school for the feeble-minded is at Enid and the reform school at Pauls Valley.

Cities. The chief cities are Oklahoma City, the capital; Guthrie, Ardmore, Chickasha, Anadarko, Durant, Enid, Lawton, Muskogee, Pawnee, Shawnee, Tulsa, Wilburton, McAlester, Kingfisher,

Tecumseh, Hobart, Alva, Atoka, Stillwater, El Reno, Ponca and Blackwell.

History. Oklahoma (meaning beautiful country) was originally a part of Oklahoma Territory and Indian Territory, a grant of 1834 set aside for five Indian tribes, the Cherokee, Choctaw, Chickasaw, Creek and Seminole. Here the Indians were promised that they might, undisturbed, practice their tribal government. As the land assigned afforded more room than the Indians needed white adventurers made attempts at a foothold, but were denied citizens' rights by the tribal government. In 1889 the United States Government purchased this section from them, and opened it, Apr. 22 to settlers. To the 1,400,000 acres of Creek land and 500,000 acres of Seminole territory, over 50,000 persons rushed and filed claims the first day it was opened to settlement. Guthrie, with 10,000 inhabitants, was established at once. In 1890 Oklahoma Territory was organized. In 1906, by previous agreement, tribal government in Indian Territory ended. Congress then passed an enabling act joining Oklahoma and Indian territories, and arranging for their admission as one state. Oklahoma entered the Union Nov. 16, 1907. Guthrie, the capital of Oklahoma Territory, became the temporary capital of the state. By vote of the people on June 11, 1910, Oklahoma City was made the seat of the state government.

Governors. Charles Nathaniel Haskell, 1907-1911; Lee Cruce, 1911-1915; R. L. Williams, 1915-1919; J. B. A. Robertson, 1919—.

Oklahoma City, Okla., capital of the state and county seat of Oklahoma Co., on the North Fork of the Canadian River and on the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas, the Atchison, Topeka & Santa Fe, the St. Louis & San Francisco and other railroads. The city is situated at an altitude of 1247 ft. in a fertile agricultural region and occupies a position geographically in the center of the state. Within the city limits there are about 420 m. of streets, 117 m. being paved with asphalt; and 90 m. of street railway. The location of a number of gigantic meat-packing plants adjacent to the city on the south and southeast transformed a large area into an industrial addition, with an excellent street-car system, paved streets, modern residences, schools and churches. Oklahoma City has a boulevard 30 m. in extent encircling the city. Wheeler and Northeast parks are the largest of the 16 parks and squares, which aggregate a total of about 1860 acres. The city also contains a large Exchange Building, Federal Building, a Carnegie library, four private and two city hospitals, about 15 hotels, 18 banks, a number of theaters, over 30 public schools, one of the finest high schools in the West, costing $500,000, and about 40 churches and missions.

Cotton, broom corn, wheat, corn and oats are the staple crops of the surrounding region. Petroleum, natural gas and coal are important factors in the resources of the city. Among the manufacturing establishments are cotton-compress works, cotton gins, cottonseed-oil mills, packing houses, cracker factories, flour mills and about 200 factories which turn out finished products. Oklahoma City is an important jobbing center and has a large trade in live stock, fruit and farm products. A large colony was established on the site of the present city on Apr. 22, 1889, the day on which the country was, by proclamation, declared open for settlement. The seat of the state government was changed from Guthrie to Oklahoma City on June 11, 1910. Population in 1920, 91,295.

Oklahoma, University of, at Norman (1892). Supported from income from generous land grants (Section 13 Fund and New College Fund), and appropriations by State Legislature from direct taxation. The appropriations for the next biennium amount to approximately $2,000,000.00.

The enrollment reached a total of 3683 for 1918-19. Faculty now numbers about 175, and in addition some fifty special lecturers in the School of Law, Department of Economics, in Geology, Medicine, etc. It maintains the follow-

ing schools, colleges, and departments: College of Arts and Sciences, College of Engineering including Civil, Electrical, Mechanical, Chemical, Mining, and Geological Engineering; School of Law, School of Pharmacy, School of Public and Private Business, School of Social Service, School of Education, School of Journalism, School of Medicine, Training School for Nurses, Department of Domestic Science and Art, School of Fine Arts. Its library contains upwards of 30,000 volumes.

Oldenburg, *Ole' den boork,* a state of Germany, formerly the Grand Duchy of Oldenburg. Its capital is the city of Oldenburg. Its location, configuration and possessions are reminiscent of a time when the ruling houses in Germany considered the territory of the German people as private property. It is curiously inserted in the state of Hanover. The only land boundary other than Hanover being the free city of Bremen to the east; but more than one hundred miles to the south is a little island of territory —the Principality of Birkenfeld—which is a part of Oldenburg. It also includes in its area the Principality of Lubeck.

Its industries are not different from those of the northwest coastal plane of Germany in general. Much of its land is unfit for cultivation. Its principal crops are cereals, hay, potatoes, and beans. Stock raising is quite extensive. There are manufactures of tobacco, knit goods, linoleum and brick.

The territory was early inhabited by the Germanic tribe known as the Chauci, later merged with the Frisians.

Its early history blends with that of Denmark. In the fifteenth century the Count of Oldenburg became King of Denmark. In 1667 it became a part of Denmark. In 1777 the state was made a duchy, a grand duchy in 1815. It became a part of the German Empire in 1871, of the German Republic in 1919. Population about 440,000.

Old Forge, Pa., a city of Lackawanna Co., 4 m. s.w. of Scranton, on the Lackawanna River and on the Lehigh Valley and the Delaware, Lackawanna & Western railroads. The city is situated in the anthracite regions of the Lackawanna Valley, and the chief industries, besides the mining and shipping of coal, are glass blowing, making chemicals and fertilizers and manufacturing silk goods. Old Forge was settled in 1830 and incorporated in 1899, having been organized from a part of the township of the same name. Population in 1920, 12,237.

Old Ironsides. See CONSTITUTION, THE.

Old South Church, a famous church on Copley Square, Boston, built about 1730, on the site of a church previously erected in 1669. The land upon which Old South stands was known as Governor Winthrop's "Green." In Revolutionary times the church was the scene of such meetings as earned it the name of the "Sanctuary of Freedom," and during the siege of Boston it was turned into a riding school by the British troops. Today it serves as a museum, mostly of Revolutionary relics and portraits; and as a lecture hall, being used by "The Old South Lectures to Young People" for historical and patriotic purposes.

After the great fire in Boston in 1872 the church was in imminent danger of removal, since the buildings around were all destroyed and it was an obstruction to the new plans for rebuilding. Oliver Wendell Holmes, however, wrote his famous poem *An Appeal for "the Old South,"* and saved the historic structure.

Full sevenscore years our city's pride—
The comely Southern spire—
Has cast its shadow, and defied
The storm, the foe, the fire;
Sad is the sight our eyes behold;
Woe to the three-hilled town,
When through the land the tale is told—
"The brave 'Old South' is down!"

In bridal garlands, pale and mute,
Still pleads the storied tower;
These are the blossoms, but the fruit
Awaits the golden shower;
The spire still greets the morning sun,—
Say, shall it stand or fall?
Help, ere the spoiler has begun!
Help, each, and God help all!

Olean, *O" le an',* **N. Y.,** a city in Cattaraugus Co., 70 m. s.e. of Buffalo, on the Allegheny River at the mouth of

Olean Creek and on the Erie, the Pennsylvania and the Pittsburgh, Shawmut & Northern railroads. Olean is noted for its extensive oil and lumber interests. Owing to its proximity to the Pennsylvania oil fields it is a storage place for great quantities of petroleum and is the terminus of several pipe lines. The industrial establishments include oil refineries, planing mills, tanneries, carriage works, railroad shops, glass-cutting factories, marble works, foundries, etc. Olean was settled in 1804 and chartered as a city in 1893. Population in 1920, U. S. Census, 20,506.

O"lean'der, a small tree of the Dogbane Family, cultivated in greenhouses or as an ornamental shrub. The juice is slightly milky and poisonous; the leaves are leathery and stiff and marked with rigid veins. The flowers are showy and grow in long clusters. The individual blossoms are tubular and may be white, rose, variegated or streaked in color and single or double in form. One variety has fragrant flowers, but ordinarily they are scentless. The tree grows to a height of six or eight feet, but is a somewhat tender plant, which will not endure the winters of northern United States. If kept within doors it must be allowed to "sleep" through the winter, as it does not thrive well without an occasional resting period. The oleander is a native of India, where the Hindu, though fearing its poisonous qualities, decorates his temples with its beautiful blossoms.

Olefiant, *O' le fi" ant,* **Gas,** a gas made by heating a mixture of two parts of sulphuric acid and one part of alcohol. It is colorless and tasteless and has an odor resembling that of the oil of caraway. It burns with a bright flame, but is of no practical use except for experimental purposes in laboratories.

Oleomargarine, *O" le o mar' ga reen,* a fat made from oleo oil, milk and cream and used as a substitute for butter. The oleo oil is obtained from the leaf tallow of beef. The tallow is first cleaned and cooled, afterwards cut up, then heated in a steam-jacketed caldron to about 150° F. When cooled, it is placed under pressure to force out the oil from the stearin, which is one of the purest of fats. The oil is yellow in color and has an agreeable taste. Certain proportions of thin milk and cream, with a little butter, are added and the whole mass is churned; afterwards it is worked, salted and packed in buckets or rolls. Hog fat and cottonseed oil are sometimes substituted for beef tallow, but these make an inferior quality of oleomargarine. When the best oleo oil is employed, the product is wholesome and nutritious. It does not become rancid and is a good substitute for butter, especially in cooking. All substances entering into it are carefully examined by government inspectors, and the oleomargarine is again inspected before being placed on the market. To protect the dairy interests, Congress, in 1902, placed a tax of ten cents a pound on oleomargarine that was colored like butter, and an equal tax on renovated butter. See BUTTER.

Oliphant, *Ol' i fant,* **Mrs. Margaret** (1828-1897), an English novelist and miscellaneous writer, born in Wallyford, Scotland. Forced to support herself and three fatherless children, she earned her livelihood by writing and produced novels characterized by insight and tender humor, and critical and historical studies of great variety. Her works embrace *Adam Graeme, Magdalen Hepburn, The Makers of Florence* and *The Literary History of England from 1790 to 1825.*

Olive, a family of shrubs and trees including the common lilac and the historic olive tree. The latter is a native of Asia Minor and Syria and is among the most useful of all trees. It is a large tree with rugged bark, and though it grows slowly it generally attains a height of from 25 to 40 ft. It is exceptionally long-lived and some individuals still growing are said to be fully 1000 years of age. The leaves are gray-green, a shade now known as olive green, and are leathery in texture, smooth above but scaly underneath. The flowers are small and white and grow in long clusters in the joints of the leafstalks. The fruit,

which is familiar through the use of bottled olives, is a stone fruit, and when unripe has the same shade as the leaves; ripe, it is a rich purple-brown.

The olive grows in a dry, warm climate and is especially common in the countries bordering upon the Mediterranean, where the fruit is an important food product. It was introduced into California from Mexico by Spanish missionaries, and the variety most common there is still called the mission olive. The fruit is made use of both ripe and green, in which forms it is pickled by a lengthy process, and is bottled for shipment to all parts of the United States. In Italy and Greece dried olives are an important article of food. The oil, used everywhere as a food and a medicine, is obtained by crushing the fruit and pressing it in stone or bronze mills. It is carefully cleansed before using. The lower grades of oil are used for illuminating and lubricating purposes and in the manufacture of soap. Another kind of oil, made from the fermented fruit, is used in dyeing. The extensive use of olive oil is responsible even for the name *oil*, which is derived from the Latin name of the tree, *olea*. The wood is hard, has a beautiful grain and is susceptible of a high polish. Its roots are also finely marked and, with the trunk wood, are valuable for cabinetwork.

The olive is often spoken of in Biblical history: its branches were brought by the dove to the ark; its wood was used in the construction of the Temple at Jerusalem; the Mount of Olives was so named because of the orchards upon its slopes; and the name Gethsemane means oil press. The olive figures in classic legend as sacred to Pallas Athene. The victor in the Olympian games was crowned with olive leaves, and the branch was, and still is, the emblem of peace.

Olive Oil, an oil extracted from the fruits of the olive tree. The olives are gathered as soon as picked and put under pressure, when they are reduced to a pulp and the oil is expressed. This pulp is re-pressed several times, the oil deteriorating with each operation. The oil is filtered, refined and clarified until it becomes a golden-yellow, and it is then suitable for the table. Italy has long been noted for its olive oil, but California is now producing large quantities of the highest grade. Peanut oil and cotton-seed oil are largely used as substitutes and adulterants for olive oil. See OLIVE.

Ol'iver Op'tic. See ADAMS, WILLIAM TAYLOR.

Olives, Mount of, or **Mount Olivet,** a mountain lying to the east of Jerusalem, from which it is separated by a narrow ravine known as the Kedron Valley. The abundance of olive trees growing on its slopes gave it its name. It is about 2600 ft. in altitude and its ridge is marked by three distinct summits. Mt. Olivet is of exceeding interest because of its sacred associations. On its slopes Christ talked to his disciples, round its eastern and southern side lay the road on which he made his triumphal entry into Jerusalem, at its base, in the Garden of Gethsemane, he suffered and prayed, and from the mountain he ascended to heaven.

Olmsted, *Om' sted,* **Frederick Law** (1822-1903), an American landscape architect, born at Hartford, Conn., and educated at Yale and Amherst. He early engaged in farming, but, following extensive travels in Europe and America, became landscape architect and superintendent of Central Park, New York City. During the Civil War he rendered efficient service as secretary of the United States Sanitary Commission. He aided in planning many of the largest parks of New York, Brooklyn, Boston, Montreal, Chicago and Milwaukee, the grounds of the Capitol at Washington and features of the Columbian Exposition in Chicago. Moreover, he wrote largely on agricultural methods and phases of landscape gardening.

Ol'ney, Richard (1835-1917), an American statesman, born at Oxford, Mass. He graduated at Brown University in 1856, studied three years at Harvard Law School, and began a successful practice in Boston. In 1874 he became a member of the State Legislature. His service here was brief, however, because

of the demands of his extensive law practice. In 1893 he was appointed attorney-general of the United States by President Cleveland, and two years later he became secretary of state. His administration of these public affairs was characterized by ability of a high order. He was tendered the position of ambassador to Great Britain by President Wilson, but declined.

Olympia, *O lim' pi a,* **Wash.,** the capital of the state and county seat of Thurston Co., situated on Puget Sound, 65 m. from the Pacific Coast, 100 m. n. of Portland, Ore., and on a branch of the Northern Pacific Railroad. The city is located on a peninsula with mountains on each side and occupies a site of remarkable beauty. The capitol, governor's residence and courthouse and the new Temple of Justice are the most prominent public buildings. The Temple of Justice is the first of a group of government buildings being erected on Capitol Place on Budd Inlet. The group will include the new capitol and several office buildings, and when completed will form one of the finest groups of state buildings in the Union. The chief industries include the manufacture of pottery, lumber, shoes, soap and lumber products. The city has many beautiful residences, paved streets and an electric-railway system, and enjoys a prosperous trade with the surrounding country. Population in 1920, U. S. Census, 7,795.

Olympian Games, athletic events originally held in a now celebrated stadium on the plain near Mt. Olympus in Greece. The somewhat informal contests of very early times gradually won favor, and by 776 B. C. Sparta joined other peoples of the Peloponnesus in keeping a regular catalogue of the Olympic victors. The games were held every four years; hence the period of time between two series of games came to be known as an Olympiad. From about 572 B. C. the Olympic games were of interest throughout all Greece, and everywhere her people accepted the belief that by harmonious discipline of both mind and body men show highest honor to Zeus. At first there was but one contest, a foot race. Subsequently the number of events was increased to 24. In the times of Roman supremacy the games were first thrown open to competitors not native Greeks.

After nearly 13 centuries these games were forbidden by the Emperor Theodosius, in 394, but were revived after 15 centuries had elapsed, and celebrated at Athens in 1896. Members of the royal family of Greece participated in efforts for the revival of interest in such contests, and a stadium seating 70,000 people was constructed. The famous long-distance foot race from Marathon to Athens attracted special attention. This is commemorative of the famous runner who in ancient times gave his life in bringing to Athens news concerning the defeat of the Persians. Subsequent celebrations of the games occurred at Paris in 1900, St. Louis in 1904, Athens in 1906, London in 1908, Stockholm in 1912 and in Antwerp in 1920. See STADIUM.

Olympus, *O lim' pus,* the ancient name of several mountains or mountain chains. The most famous of all is the range dividing Thessaly and Macedonia. Its highest peak, particularly called Olympus, is over 9700 ft. above sea level. It was fabled to be the home of the gods, who dwelt not only upon the mountain but also above it.

Olyphant, *Ol' i fant,* **Pa.,** a city of Lackawanna Co., 4 m. n.e. of Scranton and about 9 m. from Carbondale, on the Lackawanna River and on the Delaware & Hudson and the New York, Ontario & Western railroads. It has large collieries and is situated in an important anthracite field. There are extensive blasting-powder mills, machine shops and ironworks, but the chief industry is coal mining and shipping. Olyphant was settled in 1857 and incorporated in 1877. Population in 1920, 10,236.

Omaha, *O' ma hah',* a tribe of North American Indians. They belonged to the Sioux family and were found by Marquette in 1673 in Minnesota and Iowa. They now live in Nebraska, having left their villages in the Northern States be-

OMAHA

cause of a smallpox epidemic. They are agricultural and number about 1200.

Omaha, Neb., commercial metropolis of the state and Missouri River Valley, county seat of Douglas Co., 492 m. s.w. of Chicago, on the west bank of the Missouri River, 18 m. above the mouth of the Platte River, and on the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Illinois Central, the Chicago, Milwaukee & St. Paul, the Union Pacific, the Wabash, the Chicago Great Western and other railroads. A number of bridges over the Missouri River connect the city with Council Bluffs, Iowa. The city has a fine system of street railways, which give excellent service to the attractive suburbs of Florence, Benson, Ralston and Dundee, as well as various resorts, which include Lake Manawa on the Iowa side of the river. Omaha is the center of the great corn- and wheat-producing belts of Iowa and Nebraska, and, together with South Omaha, forms one of the largest meat-packing centers of the country. Omaha is the headquarters of the United States Military Department of the Missouri, and military posts are located at Ft. Crook and Ft. Omaha near the city.

Parks and Boulevards. The public parks of the city are connected by a fine boulevard system of 28 m., and comprise a total area of over 941 acres. The largest parks include Hanscom, Riverview, Bemis, Levi Carter, Krug, Miller and Elmwood. Three country clubs and golf grounds are located within the limits of the city. The finest residential districts extend over the hills and bluffs, while the portions of the city adjacent to the river are given over wholly to commercial and industrial interests. Farnam, Douglas, Leavenworth and Dodge streets extend almost the entire length of the city from east to west. The main avenues are wide, well-paved and profusely shaded.

Public Buildings. Among the noteworthy buildings are the courthouse, costing $1,350,000; Federal Building; city hall; a public library; the Auditorium; the Omaha National Bank, the Bee, the Y. M. C. A. and Y. W. C. A. buildings; City National Bank and Union Pacific buildings, each 16 stories; the Woodmen of the World Building of 18 stories; hotels, fine business blocks and 99 handsome churches, which include a Protestant Episcopal and two Catholic cathedrals. The city is the seat of a Catholic see and of an Episcopal bishopric.

Institutions. Among the leading educational institutions are a state school for the deaf, the medical department of the University of Nebraska, the Presbyterian Theological Seminary, opened in 1891, Brownell Hall, Academy of the Sacred Heart, St. Catherine's Academy, Omaha University and Creighton University (Catholic). Creighton University was founded in 1879 in honor of Edward Creighton. There is an excellent system of public schools, including two high schools, one of which is among the finest in the country and cost $1,275,000. The benevolent and charitable institutions include St. Joseph's Hospital (Catholic), built as a memorial to Count John A. Creighton, brother of Edward Creighton, who gave $1,250,000 in his will to found scientific and other departments of Creighton University; the Presbyterian, Methodist and Immanuel (Swedish) hospitals and numerous private institutions.

Industries. Owing to the railroad connections and its central position in a great agricultural and stock-raising country the city has had a rapid growth. Omaha assumed second place in the world's markets during 1912 as a live-stock center. The important manufacturing establishments include extensive smelting and refining works for silver and lead, large railway repair shops and flour and grist mills. Meat packing began in 1871, but the removal of the stockyards to South Omaha in 1884 caused a city of considerable size to grow up around them (See South Omaha, Neb.). Other manufactures include linseed oil, boots and shoes, white lead, brick, wagons and carriages, carbonated products, whips, harness,

electrical machinery, structural iron, hotel supplies, boilers and steam engines. There is an important trade in live stock, lumber, grain and farm products. The creamery-butter output aggregates 20,000,000 lb. annually.

HISTORY. The first permanent settlement was made in 1854, and the growth of the city was greatly advanced by the construction of the Union Pacific Railroad, work on which was begun in 1864. Omaha was named from the Omaha Indians. From June 1 to Nov. 1, 1898, the Trans-Mississippi and International Exposition was held here. Population in 1920, U. S. Census, 191,601.

Oman, *O mahn'*, **Gulf of,** an arm of the Arabian Sea, separating Persia from Oman on the Arabian Peninsula. The Straits of Ormuz connect it with the Persian Gulf. Maskat, in Oman, is its only important port.

Omar Khayyám, *O' mar Ki yahm'*, (?-about 1123), a great Persian mathematician, astronomer, philosopher and poet, born at Nishapur. He is supposed to have derived the epithet *Khayyám* (the tent maker) from his father's trade. He was well educated for his time, and had a remarkable memory. As a youth he formed a close friendship with Nizamul-Mulk, who, when he became vizier, bestowed on Omar an annual stipend amounting to about $3000. He was thus enabled to devote himself to study, with the result that his standard work on algebra raised him to the foremost rank among mathematicians of his day, and he was appointed court astronomer. With seven other scientists he reformed the calendar, the new reading dating from March 15, 1079. Omar's scientific fame, however, is surpassed by his poetical renown, and this is due to his epigrams written in the form of quatrains, some 500 of which go to make up a work entitled the *Rubáiyát*. Many of these epigrams are bitter in denouncing the narrowness and hypocrisy of religion, some voice a passionate protest against inevitable fate and others sing the praises of wine, love and pleasure. A portion of them have been translated freely into English verse by Edward FitzGerald.

Om'nibus, a name given to a four-wheeled vehicle similar to an enclosed carriage, having a long body with a strong roof. The seats are usually arranged along the sides, with a passage way between in the center. Protection against the weather is secured by having glass windows around the exterior. Previous to the introduction of street railways, omnibuses were in general use for transporting passengers, but in the United States they are now employed principally in small towns to convey passengers and hand baggage from depots to hotels. Some are large enough to carry 50 passengers inside and on top. In London, Paris and other large European cities, omnibus lines are still common.

Omnibus Bill. See COMPROMISE OF 1850.

Omsk, a city of Russia, the capital of the Province of Akmolinsk, situated in western Siberia at the confluence of the Irtysh and Om rivers, and on the Trans-Siberian Railway. Here are a military school for Cossacks and several academic institutions, some of them founded by the society for education organized for this purpose. The industrial plants include railway workshops, a steam sawmill and tanneries. It is an important military station, and the "fort" of Omsk was erected in 1716. Population in 1909, 88,900.

One'ga, Lake, the second largest lake of Russia, situated 85 m. n.e. of Lake Ladoga. It is 140 m. long, from 30 m. to 40 m. wide and has an area of 3670 sq. m. The shores are very irregular and are generally rocky. The water is cold and clear and abounds in fish There are numerous islands in the lake, and navigation is also obstructed by shoals and sand bars. Numerous streams flow into the lake, and it discharges its waters into Lake Ladoga by the Svir. By means of a canal which joins the Vytegra and the Kayla, Lake Onega has communication with the basin of the Volga.

Oneida, *O ni' da,* a tribe of North American Indians once living in the vicinity of the lake in New York State bearing the same name. They belonged to the Iroquois confederacy but were friendly to the French and the Americans rather than the English. They now live in a civilized state in Green Bay, Wis., in Ontario and in New York State. See IROQUOIS.

Oneida, N. Y., a city of Madison Co., 26 m. e. of Syracuse, on Oneida Creek and on the New York Central & Hudson River and the New York, Ontario & Western railroads. Oneida Castle, the ancient seat of the Oneida Indians, is in the vicinity, and two miles south is the Oneida Community, which was converted in 1881 into a joint-stock industrial company. Oneida has many points of interest and fine residences. Its industrial interests are represented by ironworks, knitting and planing mills and manufactories of flour, hosiery, wagons, furniture, steel and wood pulleys and cigars. Silverware is extensively made at the Oneida Community. Large quantities of hops and dairy products are exported from this place. The first settlers came in 1834 and Oneida was chartered as a city in 1901. Population in 1920, U. S. Census, 10,541.

Oneonta, *O" ne on' ta,* **N. Y.,** a city of Otsego Co., 61 m. n.e. of Binghamton, on the Susquehanna River and on the Delaware & Hudson and the Ulster & Delaware railroads. The construction and repair shops of the Delaware & Hudson Railroad are located here. It is the seat of the Oneonta State Normal School and the Aurelia Fox Memorial Hospital. It has silk and planing mills, foundries, machine shops and glove and cigar factories. Oneonta was settled in 1800 and received its city charter in 1885. Population in 1920, 11,582.

Onion, *Un' yun,* a garden vegetable of the Lily Family, known for its strong odor and sweet though biting flavor. The plant itself, which grows from seed or from young sets, has fibrous roots extending from a coated bulb, tall, cylindrical leaves and clusters of pretty pink- or blue-tinted flowers. In the spring the young onions are a spicy addition to table fare. Other onions which form more solid, sweeter bulbs are allowed to grow longer and sometimes attain a weight of two pounds or more. The large Spanish onion, the white Bermudas and the Strassburgs are the favorites. The raising of onions is an extensive industry in many farming districts of the United States, since the onion is one of the most widely used of flavorings. In most states the legal weight of onions is 57 lb. per bushel.

On"onda'ga, a tribe of North American Indians formerly living near Lake Onondaga, N. Y. They were one of the tribes of the Iroquois confederacy and were the guardians of the council-fire. They were a peaceful tribe, and many became converts to Christianity. The majority live in Canada on a reservation near Grand River, Ontario. Others remain on the reservation in New York State. See IROQUOIS.

Onta'rio, a province of the Dominion of Canada, bounded on the n. by Hudson Bay, James Bay and Quebec, on the e. by Quebec, on the s. and s.w. by the United States and on the w. by Manitoba. Most of the south and southwest boundary is formed by a line marking the deepest channel in the Great Lakes. The province is irregular in form. The greatest length east and west is 1000 m. and its greatest breadth, from Lake Erie on the south to Hudson Bay on the north, is about 1000 m.; its area is 407,262 sq. m., of which 40,354 sq. m. are water, including the Canadian portion of the Great Lakes. It is the second province in area, being more than three times as large as the United Kingdom and more than six times as large as the New England States. Population in 1911, 2,523,358. It is the most populous of the provinces, and nine-tenths of its inhabitants live on 1/15 of its area, the region lying between the Ottawa and St. Lawrence rivers and the Great Lakes.

SURFACE. A rocky ridge, known as the Niagara escarpment or, in the locality, as the "mountain," extends from

Queenston Heights near Niagara Falls to Hamilton at the head of Lake Ontario, thence northwest to Bruce Peninsula in Georgian Bay. This ridge divides the southwest part of the province into two sections. That to the west has elevations varying from 600 to 1700 ft., but is low along the Detroit and St. Clair rivers. The section to the east is generally rolling, with elevations varying from 400 to 1000 ft. The region between Lake Ontario and the Ottawa River is rolling, with occasional low hills. The great northern part of the province, sometimes known as New Ontario, is a table-land with an uneven surface, but no high altitudes. The northern shores of Georgian Bay and Lake Superior are in many places bold and rocky. Most of this northern region is heavily timbered.

Rivers and Lakes. The Ottawa and the St. Lawrence are the largest rivers in the eastern part of the province. The French River, the outlet of Lake Nipissing, and the Severn, which drains Lake Simcoe, flow into Georgian Bay. The St. Mary's, connecting lakes Superior and Huron, belongs to both Canada and the United States, as do the St. Clair and Detroit rivers. The St. Mary's is famous for its rapids at the outlet of Lake Superior and for its many beautiful islands. The streams flowing into Lake Superior from the north form beautiful cascades, where they descend the bluffs to reach the level of the lake. These falls constitute valuable sites for water power. Kakabikka Falls on the Kaministiquia develop electric power used in Fort William and Port Arthur. The entire province is well supplied with rivers and lakes.

Although innumerable small lakes are scattered through the province, only a few claim attention. These are Lake Nipigon, 70 m. long and 50 m. wide; Lake Nipissing, 55 m. long and 20 m. wide; the Muskoka Lakes, which are frequented by summer tourists; and Lake Simcoe. Georgian Bay is estimated to contain over 30,000 islands, most of them small, but the Great Manitoulin, 80 m. long and 30 m. wide, is the delightful home of a number of Indian tribes. All the islands are covered with verdure, making the bay one of the most attractive portions of the Great Lakes. Thousand Island Park in the St. Lawrence begins just as the river leaves Lake Ontario, and extends for about 50 m. It is also an attractive water park, whose natural beauty has been enhanced by the many attractive summer villas erected upon the islands.

Climate. In the northern part of the province (New Ontario) the winters are long and cold, but clear and bracing. The summers are cool and delightful, with occasional hot days. In the region between Georgian Bay and the Ottawa River there is usually a heavy fall of snow, but the winters are less severe than farther north. The summers are warm and sometimes hot. The peninsula between lakes Erie and Ontario has an equable climate owing to the presence of these bodies of water. The winters are mild and the summers long, with an average temperature higher than in other parts of the province. Throughout the province there is ample rainfall, varying from 30 to 40 inches throughout the year; and without exception the climate is healthful.

Minerals and Mining. In the peninsula between lakes Erie and Ontario are petroleum wells, which yield about 10,000,000 imperial gallons yearly. The yield has been gradually lessening for a number of years. Natural gas is produced from the greater part of the northern shore of Lake Erie and shows an increased supply from year to year. Salt and gypsum also occur in this peninsula. There are no other economic minerals in the southern part of Ontario. At Sudbury, north of Georgian Bay, are the largest nickel mines in the world; from them about one-half of the world's supply is obtained. Copper in paying quantities is also obtained in the reduction of the nickel ore. In the northern part of the province ores containing gold, silver, nickel, cobalt, arsenic, antimony and molybdenum are found. The extensive deposits of silver and cobalt ore near

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Lake Timiskaming have recently led to developing extensive mining operations in this region. Large deposits of corundum also occur in the Valley of the Ottawa. Around Thunder Bay and on Silver Islet in Lake Superior are some of the oldest silver mines in the Dominion. From the mine on Silver Islet over $3,250,000 worth of silver has been taken, but since 1903 little work has been done in this region other than that of prospecting and testing. Iron ore occurs in a number of localities, and Ontario supplies two-thirds of the iron produced in the Dominion.

Forests and Lumbering. The province has extensive forests. White pine and spruce are the trees of greatest commercial importance, though hemlock, fir and several varieties of hard wood are found. Lumbering is one of the leading industries of the province. The chief operations are carried on along the upper part of the Ottawa River and in the vicinity of Parry Sound. The river and lakes furnish excellent transportation facilities and large quantities of lumber are produced, Ontario ranking first in this industry. There are also many pulp mills in the lumber regions. Most of their product is made from poplar and spruce.

The provincial government maintains a department of forestry, which cooperates with the Dominion department in preventing forest fires, reforesting denuded areas and checking the ruthless waste of lumbermen.

Agriculture. Agriculture is the chief industry of the province and three-fourths of the inhabitants are engaged in it. Most of the farms that have been developed are in the southeastern part of the province and are worked by their owners. Until recently it was supposed that the great northern section (New Ontario) was worthless for farming purposes, but a more complete survey of this region shows that there are extensive areas of excellent agricultural land and that the timber on it is of sufficient value to pay for the clearing. Moreover, the climate of the region is suitable for raising all the hardier cereals and vegetables and large quantities of forage. In Old Ontario the soil is of a high degree of fertility, and the temperature and rainfall are very favorable to all kinds of mixed farming and to dairying and the raising of live stock. Ontario is noted for its excellent breeds of cattle, horses and hogs and also for the quantity and quality of its dairy products, which are manufactured in cheese factories and creameries. Wheat, oats, barley, peas, potatoes and hay are the staple crops. Garden vegetables, apples and small fruits are grown throughout this part of the province, and in the Niagara Peninsula large quantities of peaches, plums and grapes are raised. In general, scientific methods and the most modern implements and machinery are employed. The provincial department of agriculture renders the farmers most valuable assistance in promoting the introduction of new branches of the industry, in finding markets for the products and in maintaining an agricultural college and experimental farm at Guelph.

Manufactures. The abundant water power supplied by the many rapid streams, the presence of raw material and the demands of a rapidly growing market have led to a rapid development of manufactures. The chief industries are related to lumber and lumber products. There are numerous flour mills in the older part of the province, and in the large cities and towns are tanneries, woolen mills, foundries and machine shops, breweries and distilleries and, in some railway centers, construction and repair shops. The manufacture of agricultural implements is rapidly increasing and the output of textile and paper mills is yearly becoming of greater value as a source of income.

Other Industries. The fisheries on the Great Lakes furnish employment to a large number of people and are valued at over $2,500,000 yearly. In the extensive forests of the north are many fur-bearing animals, and hunting and trapping afford a good source of income in this region.

Transportation and Communication. At Sault Ste. Marie are the largest canal locks in the world, which afford passage to the largest steamers on the Great Lakes (See Sault Ste. Marie Canals). The St. Mary's and St. Clair rivers have been canalized, so that boats having a draught of 21 ft. can pass from Duluth to Buffalo. By means of the Welland Canal (See Welland Canal) and canals around the rapids in the St. Lawrence, boats drawing 14 ft. can pass to and fro between the Great Lakes and Montreal. The Rideau Canal extends from Ottawa to Kingston and forms a short route between Lake Ontario at this point and the Ottawa River. The entire southeastern part of the province is amply supplied with railways, which extend through it in all directions. All lines are under the control of the Canadian Pacific, the Canadian Northern and the Grand Trunk System. The main line of the Canadian Pacific passes along the northern shore of Lake Superior into Manitoba, and north of it the Grand Trunk Pacific has opened a great region to settlement. Excellent mail, telegraph and telephone facilities are found throughout the settled portions of the province.

Government. The chief executive is the lieutenant-governor, appointed by the governor-general of Canada in council for five years. He is assisted by an advisory council consisting of the heads of the departments of the provincial government and appointed by himself. The Legislature consists of an Assembly of 106 members, chosen by the qualified voters of the province. The judges of the courts are appointed by the Dominion Government for life. The Assembly has power to legislate upon all matters pertaining exclusively to Ontario, provided their acts conform to the constitution of the Dominion and the acts of the Dominion Parliament.

Education. Ontario has an excellent system of public schools, which are supported by provincial grants and local taxation. There is a minister of education who is a member of the advisory council, and a provincial superintendent, with ample executive powers. The qualifications for teachers of elementary schools are unusually high, and the province supports normal schools in a number of cities; also two faculties of education, one at Toronto in connection with the University of Toronto and the other at Kingston in connection with Queen's University, for the preparation of teachers. Attendance at public and separate schools between the ages of 8 and 14 is compulsory and the law is strictly enforced by truant officers. The schools are nonsectarian, but both Roman Catholics and Protestants have the right to maintain separate schools upon demand of not less than five families in any district. High schools and collegiate institutes are found in the cities and larger towns. The elements of agriculture are taught in the rural schools, and many of them have school gardens in which the principles taught in the classroom can be applied. The University of Toronto is at the head of the educational system, and the elementary and secondary schools are affiliated with it, as are most of the denominational universities. Among the leading institutes are Victoria University, Upper Canada College, Knox College, Wycliffe College, Huron College and St. Michael's College. The agricultural college at Guelph is considered one of the best in North America. There are a dairy school and a school of mines at Kingston, a school for the deaf and dumb at Belleville and one for the blind at Brantford.

Cities. The chief cities are Toronto, the capital; Ottawa, the capital of the Dominion; Hamilton, London and Kingston.

History. Samuel Champlain visited the country in 1615 and was probably the first white man to enter it. The French established friendly relations with the Huron Indians, and the Jesuit missionaries founded a number of stations among them, but the Iroquois practically destroyed the Huron nation and depopulated the country. Ft. Frontenac, on the site of Kingston, was built in

1673, and a trading station was established on the site of Toronto in 1749, but there was no systematic attempt to develop the country until after it became a British possession in 1763. In 1783 a large number of Loyalists from the United States entered the province and determined very largely the character of its institutions. During the war between Great Britain and the United States, 1812-1814, battles occurred at York, now Toronto, on the Thames River at Moraviantown, at Queenston and at Lundy's Lane. In 1837 a rebellion broke out as a protest against local governmental conditions. It was soon put down and the leader, William L. Mackenzie, fled to the United States. In 1791 Canada was divided into two provinces, Upper and Lower Canada, by the Constitutional Act. In 1841 these two provinces were united and formed one province known as Canada. This continued until 1867 when Canada and the provinces of Nova Scotia and New Brunswick were united to form the Dominion of Canada, the province formerly known as Upper Canada being called Ontario and that known as Lower Canada being called Quebec. Since the formation of the Federation, Ontario has been remarkably prosperous.

Onyx, *On' ix,* a hard variety of agate composed of layers, usually curved, of white alternating with red (sardonyx) or gray (chalcedony); the colors black, green and brown also occur. The finest specimens come from India. The ancients esteemed onyx highly as a gem, particularly for cameos. Its advantage as a cameo stone is its property of stratification, which makes possible the working out of a subject in relief upon a background of a different color. Apart from its use as a gem stone, it is made into beads, and such larger objects as cups and bowls, table tops and vases, pillars and other details of architectural structure. The stairway of the Paris Opera is made entirely of onyx. Mexican onyx is softer than real onyx; Gibraltar stone is only an onyx marble; and Algerian onyx is a variety of calcite artificially colored.

Onyx Marble, an ornamental stone, composed chiefly of carbonate of lime and used for interior architectural finishings, and small articles, such as table tops, paper weights, bases for statuary and vases. It includes two rock types: one in which the formation is caused by hot-spring deposit; the other in which the deposition has been made by cold water upon the roof, floor or walls of limestone caves. In some varieties deposits of successive layers give a beautiful banding effect, while on others colored cloudings and veinings appear, due to the presence of metallic oxides. These marbles are widely distributed, but large accumulations are rare. They are found in Arizona, California and Colorado, but the chief supply of the United States comes from Mexico.

Oolite, *O' o lite,* a compact variety of limestone composed of small round grains that resemble the spawn of fish. The name is from the Greek word meaning egg. The grains vary in size from a pinhead to a pea. When they are very large the rock is known as pisolite or pea stone. See LIMESTONE.

O'pal, a precious stone, composed chiefly of silica. It contains from 2 to 13 per cent of water and is very brittle. In color it is usually pale yellow, red, blue and green, though sometimes found in dark shades, coloration depending upon the different dioxides. The opal is never found in crystals and is sometimes nearly transparent. The gem shows to best advantage when the upper surface is cut in convex form. The precious opal, sometimes called the Oriental opal, is bluish or yellowish in tint and semi-transparent, and contains minute fissures filled with air and moisture, which cause a brilliant play of prismatic colors. The fire opal is also a beautiful and valuable variety. Opals are found in Queensland and New South Wales, Australia; and in Idaho and Washington in the United States. The finest stones come from Dunkirk, Hungary.

Open-Door Policy, a term of diplomatic significance in international politics which came into general use in 1899,

and which indicates an arrangement binding by general consent, rather than by treaty, whereby all nations are allowed to trade in China and its dependencies upon equal terms. This agreement so far as the United States and other powers are concerned places China commercially in the same relation she occupied before the spheres of influence were recognized. Her tariff rates are to be uniform for all nations with which she has trade treaties. This result was brought about by Secretary of State John Hay in 1899, when he made a request of the great powers that they make a pledge of noninterference with any vested commercial interests wherever their influence extended. Russia was the only European nation refusing to accede to the request. The open-door policy is one principle of the Anglo-Japanese Treaty, and it tends to prevail among European nations. Great Britain, Germany, France, Norway, Sweden and Russia have now all agreed to abide by this policy in their trade with weaker powers.

Open-Hearth, *Harth,* **Furnace,** a furnace of the flame type for working iron into steel. This furnace is similar in principle to that of the reverberatory furnace (See REVERBERATORY FURNACE), wherein the flame is brought in contact with the metal on a hearth, and a roof over it projects the heat downward towards the metal. In addition to the hearth and connected with it by various flues are chambers composed of checker-brick work for the purpose of heating the air and gases required for combustion. The construction varies in minor details for different capacities, etc., but a well-known and typical open-hearth furnace consists of regenerative chambers of checkerwork construction, which are separate from each other. Underneath is the hearth shaped like a huge saucer. Either chamber may be connected with the smokestack or with the hearth.

In operating the furnace, one chamber is heated until the checker-brick work gets white hot, and through this a mixture of air and gas is admitted at the bottom, so that when this mixture reaches the hearth, it becomes quite hot and burns fiercely over the hearth and a portion of the heat is given to the charge of metal. The hot gases are afterwards brought downward through the brickwork of the second chamber, and serve to heat it before escaping into the smokestack. The hearth is sometimes made so that it can be tilted to receive its charge and deliver the contents of molten metal. For this purpose various mechanical aids, operated by hydraulic and pneumatic power, are employed. The open-hearth furnace is lined either with sand and siliceous slag, or dolomite, depending upon the process used in making steel.

Op'era, a drama set to music, or in which music constitutes the chief part. The parts are sung or recited to music, and an overture usually precedes the opening scene. Operas are designed for orchestral music, and large orchestras are usually employed for the accompaniment. The parts consist of solos, duets, quartets and choruses, which are usually enlivened by dancing. Opera is classified as grand opera, which deals with serious themes, has an elaborate musical composition and is presented with elaborate and striking scenery; and comic opera, or opera bouffe, which is characterized by a light theme and light popular music. Some operas occupy a position between these two, containing a combination of the serious and the humorous.

Opera is supposed to be the outgrowth of the early Greek plays, but modern opera originated in Italy early in the 16th century, and it now offers opportunity for almost every form of musical effect. The following are among the most celebrated operas: *The Barber of Seville,* Rossini; *Faust,* Gounod; *The Magic Flute,* Mozart; *Don Giovanni,* Mozart; *Aïda,* Verdi; *La Traviata,* Verdi; and the following operas by Richard Wagner: *Tannhäuser, Tristan and Isolde, Parsifal, Lohengrin* and *Hansel and Gretel.* Among light operas the following are widely known: *Martha,* Flotow; *The Mikado,* Sullivan; *Pinafore,* Gilbert

and Sullivan; and *Robin Hood*, De Koven.

Opera Glass, a small, handy, portable, double telescope, having double-concave lenses for eyepieces and double-convex lenses of larger diameters for object glasses. The eyepieces are fitted over tubes which slide in and out by turning a screw, so that the focus is easily obtained. It is used to magnify objects at a distance, especially in operas and theaters; hence its name. See FIELD GLASS; LENS; TELESCOPE.

Ophthalmoscope, *Of thal' mo skope,* an instrument employed for examining the interior of the eye and detecting diseases in it. It consists of a concave, circular mirror, with a hole in its center, and having a handle mounted on a stand supplied with a set of lenses that can be adjusted. The instrument is placed in a dark room in front of the patient, who is seated with a light behind him, so adjusted that it is reflected by the mirror into the eye. The oculist views the interior of the eye through the lenses, which so magnify the membrane that it can be readily examined.

O'pium, the dried juice procured from the fruiting pods of all poppies, but chiefly from those of the opium poppy, and extensively used as a narcotic. The plant is a native of eastern Asia, but is grown in Europe and America partly for the drug but often merely as an ornament. To obtain opium, cuts are made in the pod, and the milky juice is allowed to exude. It is left 24 hours upon the plant, and there, in contact with the air, it becomes a waxy, brown substance easily molded into small cakes for the market. Opium contains 19 alkaloids, chief of which is morphine; one of its common forms is an alcoholic solution known as laudanum.

Medicinally, opium in small doses is a stimulant; in large ones, a narcotic. It is probably chiefly employed as a sedative by persons who have formed the habit of smoking it, taking hypodermic injections or using it in tablet form. Its first effect is to render the one who takes it free from pain and anxiety and to give to him the pleasurable sensations of happiness and comfort. As this effect begins to wear off a period of depression follows, which seems to require a second dose of the drug. Thus a drug habit is formed which is disastrous in its effects and extremely hard to break. In its later stages, the opium habit causes loss of memory, and a lack of the moral sense which enables one to distinguish between right and wrong. The Chinese and people of other eastern Asiatic countries are probably the greatest opium smokers.

Poisoning from overdoses of opium frequently occur and should be treated by use of emetics. Opium in any form should never be used except under the direction of a competent physician, and the use should be discontinued at the earliest possible moment.

Oporto, *O pore' too,* a city and seaport of Portugal, situated on the Douro River about 3 m. from its mouth and 172 m. n.e. of Lisbon. The location of the city, nestling on the hillsides between two rocky headlands, is picturesque, and in the upper and modern part of the town the wide avenues command a fine view of the river below and the ocean beyond. The prominent buildings are the "Tower of the Clergy," the Crystal Palace, the Gothic Cathedral, several schools and churches and the English factory house. The manufacturing establishments are important and include sugar refineries, tanneries, distilleries and manufactories of beverages, pottery, fabrics and jewelry. Port wine, to which the town gives the name, constitutes the principal article of trade. As the chief industrial city of Portugal, the harbor facilities have recently been extensively improved. Population in 1900, 167,955.

Opos'sum, an interesting member of the Opossum Family of Marsupials. There are over 20 species, one of which John Smith described in his early history of Virginia. The opossum is about the size of a cat, has big eyes, a pointed, white face and a long hairless tail which it uses much like a fifth paw. By means of it, the opossum will hang, sleeping, from its favorite yum tree or carry bun-

dles of dried leaves and grasses for its winter nest in a tree hole. It is a familiar sight to see the young upon the mother's back grasping her tail tightly with their own. The opossum has a ruffled coat which always looks unkempt because a part of it is long and white, and another underneath is short and brown. Like all Marsupials the opossum has a pouch for carrying the young, which are born in a helpless condition.

One of the most peculiar and unexplainable characteristics of the opossum is its habit, upon being pursued, of "playing dead." It suddenly drops to the ground, draws back its gums from its teeth, as though dead for a long time, and lies apparently without heartbeat or breath. If, however, the pursuer turns to look for a club, the "dead 'possum" is up and away, or if his hand comes too near the white teeth they act suddenly and viciously. The flesh of the opossum is tender and greatly prized in the South. The phalanger in Africa is often wrongly spoken of as the opossum. It is a member of an allied family of Marsupials, but does not particularly resemble the opossum.

Op'per, Frederick Burr (1857-), an American illustrator, born in Madison, Ohio. For three years he was on the art staff of Frank Leslie's magazines and for 18 years he was connected with *Puck,* which he left in 1899 for Hearst's New York *Journal.* He has illustrated for Bill Nye, Mark Twain, Hobart and Peter Dunne, and has written *The Folks in Funnyville* (with his own verses and pictures), *Our Antediluvian Ancestors, Happy Hooligan, Alphonse and Gaston, John Bull, Happy Hooligan Home Again* and *Maud the Matchless.*

Op'tic, Oliver. See ADAMS, WILLIAM TAYLOR.

Op'tics, the science of light. See LIGHT.

Optimism (from Latin *optimus,* best), a term opposed to pessimism and applied to the disposition to look on the bright side of things and to hope for the best. In metaphysics, it is the doctrine, receiving classic expression in the system of Leibnitz, that the world is the best one possible, and that everything in nature is so ordered as to produce the greatest good. In Christianity, it is the belief that God is in the world working out his beneficent purposes, that pain and suffering are but incidental to a higher good, and that the consummation of the historical process will result in the highest development of the aspiring individual and the human race.

Oracles. See GREECE, subhead *Oracles.*

Orange, *Or' enj,* a well-known and popular fruit grown upon a small evergreen, subtropical tree of the Rue Family. The tree is not unfamiliar in the North, through its cultivation in greenhouses and conservatories, but there it rarely grows to be more than a shrub, and its fruit is small and generally unpalatable. The leaves of the orange are long, shiny and of a bright green color. The blossoms are waxy white and very fragrant and have come to be the significant flower for the bridal wreath. The tree itself rarely grows to a height of more than 30 ft., and in most groves is pruned back to improve the quality of the fruit.

The orange tree is native in Asia, but has long been cultivated in southern Europe and parts of the United States. It is a long-lived tree and under favorable circumstances is remarkably productive. The fruit consists of a sweet, juicy pulp of from ten to twelve sections, surrounded by an orange-yellow rind containing a bitter aromatic oil. Most oranges have seeds, but the variety considered most desirable is seedless; it is called the navel orange and has a peculiar growth at the apex.

Oranges are especially fitted for shipping as they keep well; they are at their best at a time when other fruit is more scarce, and the juice is always considered healthful and appetizing. The common orange is the sweet, or Chinese, orange. The blood orange is a variety of this, having a red pulp and a rough red rind. The mandarin orange, also a Chinese variety, is small and somewhat flattened but

has a pleasant flavor. The Seville, or bitter, orange is an Arabian species used chiefly for making marmalade. Russets are a dark-skinned variety raised commonly in Florida.

Probably oranges are among the foremost of fruits upon the market. In the United States, California and Florida lead in their production. The orange trees in the United States number more than 8,000,000 and the annual yield averages more than 20,000,000 boxes. The orange blossom is the state flower of Florida.

Orange, N. J., a city of Essex Co., 4 m. n.w. of Newark and 12 m. w. of New York City, adjoining East Orange and South Orange and on the Orange Branch of the Erie Railroad and the Morris & Essex Division of the Delaware, Lackawanna & Western Railroad. The city is attractively situated at the base of Orange Mountain and contains numerous elegant residences and estates of New York City and Newark business men. With East Orange, South Orange and West Orange, it constitutes practically a single community known as "the Oranges." The city has many miles of broad and well-shaded streets and long lines of hedges. Adjoining the city are Hemlock Falls in South Orange, and Llewellyn Park of 750 acres is in West Orange. Electric lines connect with Newark, Jersey City, Montclair, Bloomfield, South Orange and other neighboring cities.

Public Buildings. The noteworthy buildings include Orange Memorial Hospital, with Shepard pavilion and a training school for nurses, an orphanage, House of the Good Shepherd, Stickler Memorial Library, Columbus School Building, Music Hall and Masonic Temple. The First Presbyterian Church, originally built in 1719, and several times remodeled, is of historic interest. The city has a good school system and several private schools, including the Dearborn-Morgan School for girls, the Carteret Academy for boys, Locke College for boys, Seton Hall College (Catholic) for men and boys, and a public library.

Industries. Orange is widely known as the center of an important felt-hat manufacturing industry. Other manufactured products include lawn mowers, pharmaceutical supplies and phonographs. Adjoining Llewellyn Park is the famous Edison laboratory.

History. Orange was settled about 1666 by a colony from Connecticut. At first it was called Newark Mountain and belonged to Newark. The residents of Newark Mountain established a separate church and the organization was known as the Mountain Society. This church is now known as the First Presbyterian Church of Orange. In 1790 the place was called Orange Dale. The township was incorporated under the name of Orange in 1806. Parts of its territory were included in South Orange and West Orange in 1861 and 1862. East Orange was separated in 1863. Orange was incorporated as a town in 1860 and granted a city charter in 1872. Population in 1920, U. S. Census, 33,268.

Orangemen, *Or' enj men,* a secret society of Protestants founded in Ireland in 1795. Its objects are: support of the Protestant religion, defense of the ruling King or Queen of Great Britain, the union of Great Britain and Ireland and support of the reigning family so long as it remains Protestant. It received its name from William III of England, Prince of Orange, and July 12, the anniversary of the Battle of the Boyne, is Orange Day.

Orange River, the principal river of South Africa. It rises on the slopes of a peak of the Drakensberg Range, flows west and southwest, forms the northern boundary of Cape Colony, and, after a course of about 1300 m., empties into the Atlantic Ocean. Its chief tributary is the Vaal. The famous "Hundred Falls," or the Great Anghrabies, are found above its confluence with the Molopo Wadi. This and other rapids, as well as sand bars, check navigation.

Orange River Colony, now Orange Free State, a province of the South African Union of British Africa. See South Africa, Union of.

Orang-Utan, *O rang'-Oo tan",* a man-like, or anthropoid, ape of the Simian Family. In intelligence it ranks probably among the lowest of the apes. The orang-utan is a tree dweller and builds temporary night quarters for its family high above the ground. Its arms are very long and are used much like crutches, as with bent knuckles the orang-utan swings itself along the ground. In the trees, it proceeds by a hand-over-hand method, a means by which it is able to travel rapidly. The head of the orang-utan has a rounding skull and a heavy, protruding jaw. The face has dark callous spots and is surrounded by long, shaggy hair, which in the old males lengthens to a long beard beneath the chin. The entire coat is reddish-brown in color. The orang-utan is not vicious unless attacked, but then defends itself bravely. In captivity it is practically untamable, possibly because of its great shyness and fear of humankind. See APE.

Or'bit, the path of a heavenly body in its revolution about another body, as the path of the earth around the sun. The ancients believed all orbits were circles; but nearly all are elongated circles or ellipses. In the case of comets the ellipses are usually greatly elongated, making the period of revolution scores and sometimes hundreds of years. Sometimes the ellipse is infinitely elongated, becoming a parabola, in which case the comet never returns. The orbits of the satellites are more or less inclined to the orbits of their primaries. See ASTRONOMY; ECLIPTIC; PLANET; SOLAR SYSTEM.

Orcagna, *Or kahn' yah,* **Andrea** (about 1308-about 1368), one of the foremost Italian painters of the 14th century. The son of a goldsmith, he learned his father's craft and was also a sculptor and architect of renown. In his sculpturesque and graceful figures he combined tenderness, spirituality and vigor, and made considerable advance in perspective and in the treatment of light and shade. His sculptural masterpiece is the marble tabernacle in the Church of Or San Michele, Florence, the most beautiful piece of Gothic sculpture in Italy. Other notable works are *Paradise,* a mural painting in the Strozzi Chapel at Santa Maria Novella; the mosaics of the façade of the Cathedral of Orvieto; and a painted altar panel in the Strozzi Palace, Florence.

Orchid, *Or' kid,* **Family** (Orchidaceæ), a large family of highly interesting plants, whose flowers are noted for their size, colors and curious shapes. There are over 6000 species known, about one-half of which are so-called air plants.

The plants are all herbs and as a family are not difficult to recognize. The stems grow from bulbs or tuberous roots and have scaly, parallel-veined leaves which always clasp the stems at the bases and are covered with soft hairs. The flowers are irregular and have a little sheathing scale called a bract at the base of the flower stem. The sepals and petals together form two whorls which are hard to distinguish on account of their colors. Two of the sepals are alike in form and color, but the third forms a hood or sheath over the petals. The same relation is found in the petals, where two are alike but the third is an irregular, enlarged lip; this lip may be fringed, pouched, bristled or toothed, and is generally the most beautifully marked. Often, too, this lip has a spur filled with nectar, which is of especial interest for it is always of exactly the same length as the tongue of the moth which is to aid in the fertilization of the flower.

There are two classes of orchids known from their habitats: the epiphytes, or so-called air plants, which were once supposed to live upon air, and the terrestrial orchids. The epiphytes grow chiefly in the tropics. Their seed lodges in the angle of a tree and sends out a so-called root which flattens on the branches and forms a series of suction cells that hold tightly to the bark. Other roots, which have the function of providing food for the plant, hang like threads or grow in any direction from the tree in curiously contorted shapes.

Terrestrial orchids are more common in the temperate zones. Many species grow wild in the United States, and of these some of the most interesting are neglected because of the smallness of the flowers. Our most common wild species are the coralroot, twayblade, ladies' tresses, arethusa, grass pink, orchis and Lady's Slipper. Wild orchids are found generally in cool, damp woods, preferably pine or cedar, and bloom from May until August. See CROSS-FERTILIZATION; LADY'S SLIPPER.

Ord, Edward Otho Cresap (1818-1883), an American soldier, born in Cumberland, Md., and educated at West Point. He served as second lieutenant in the Seminole War, did coast survey duty, performed garrison service during the Mexican War, took part in expeditions against the Indians and aided in capturing John Brown at Harper's Ferry. In September, 1861, he became brigadier-general of volunteers, soon became major-general and commanded at Corinth, Jackson and Vicksburg. At Ft. Harrison, in the campaign against Richmond of 1864, he was severely wounded, but he later commanded the Department of Virginia from January to June, 1865, and participated in Lee's capture. He was brevetted major-general in 1865, was retired in 1880 and by special act of Congress was commissioned major-general the following year.

Ordeal, *Or' deel,* **Trial by,** a form of trial in ancient times to determine guilt or innocence. There were two principal kinds—fire ordeal and water ordeal; the former was confined to persons of high rank, the latter to the common people. In the ordeal of boiling water the accused was obliged to insert his hand into a caldron and take out a small object. After three days the hand was unbound and innocence or guilt proved by its condition. Fire ordeal was performed by taking in the hand a piece of red-hot iron, or by walking barefoot and blindfolded over glowing coals or over nine red-hot plowshares laid lengthwise at unequal distances. If the person escaped unhurt he was adjudged innocent, otherwise he was condemned as guilty. The various ordeals are still practiced among the Hindus and some African tribes.

Order. See BOTANY, subhead *Classification.*

Orders in Council. See MILAN DECREE.

Or'dinance of 1787, an act of Congress passed in July, 1787, to regulate the government of the territory northwest of the Ohio River (See NORTHWEST TERRITORY). The ordinance, which has been called "the most notable law ever enacted by the representatives of the American people," furnished the basis for the constitutions of several states. It is especially noted for three great features of good government—its guaranty of freedom of worship, its perpetual prohibition of human slavery, and the prominence given to the subject of schools and education. In the ordinance was a provision that no more than five states, and not less than three, were ultimately to be organized within this territory. No section was to be cut off and organized into a state until there were 60,000 people within its proposed boundaries. The Ordinance of 1787, the Declaration of Independence and the Federal Constitution have been called "the three title deeds of American constitutional liberty."

Or'egon, THE BEAVER STATE, one of the Pacific States, is bounded on the n. by Washington, on the e. by Idaho, on the s. by Nevada and California and on the w. by the Pacific Ocean. The Snake River forms about one-half of the eastern and the Columbia River most of the northern boundary.

SIZE. The length from east to west is 395 m., the breadth is 278 m. and the area is 96,699 sq. m., of which 1092 sq. m. are water. Oregon is over twice the size of Pennsylvania, about equal to Pennsylvania, New York and Rhode Island combined, a little smaller than Wyoming and the ninth state in area.

POPULATION. In 1920 the population was 783,389. From 1910 to 1920 there was a gain in population of 110,624, or 16.4 per cent. There are 8.2 inhabitants

to the square mile and the state's rank in population is 34.

SURFACE. The Cascade Mountains cross the state from north to south about 100 m. from the coast, and constitute its most prominent physical feature. These mountains are a continuation of the Sierra Nevadas of California and they have an average elevation of about 7000 ft., but contain a number of peaks over 10,000 ft. high. The most celebrated of these is Mt. Hood, 11,500 ft., near the northern border. Other peaks of prominence are Mt. McLoughlin, 11,000 ft., and Mt. Jefferson, 10,500 ft. Just east of these mountains is the Valley of the Deschutes River, with its unparalleled power resources.

The Cascades divide the state into two unequal parts, Eastern Oregon and Western Oregon. Eastern Oregon comprises about two-thirds of the state. In general it is a plateau region with a rolling and uneven surface in the south, and a more mountainous surface in the north. A height of land extends across this plateau from east to west, striking the eastern boundary of the state about midway between the northern and southern borders. The Blue Mountains, an irregular range with an altitude of about 7000 ft., extend across the northern part of the state; and south of them are the Cedar Mountains. In the extreme northeastern corner are the Powder River Mountains, which suggest comparison with the Alps of Switzerland. In this section the rivers have worn deep channels and canyonlike gorges wherever they have crossed the mountain range.

Western Oregon is crossed by the Coast Range, which is from 10 to 30 m. inland. This is a range of low mountains nowhere exceeding 4000 ft. in altitude. Between the Coast and the Cascade ranges there is a great fertile valley, the northern part of which is watered by the Willamette. In the southwestern section are the valleys of the Rogue and the Umpqua. The Cascade and Coast ranges are heavily timbered.

RIVERS AND LAKES. A considerable region in the southwestern part of the state is drained by the Rogue, the Umpqua and the Klamath directly into the Pacific. With this exception the entire state is drained into the Columbia. Its great tributary, the Snake, drains the eastern part, and, proceeding westward, the other tributaries are the John Day, the Deschutes and the Willamette. The Columbia is the most important stream connected with the state (See COLUMBIA RIVER).

There are a number of lakes in the southern part of the state, but the region which they occupy has not been easily accessible owing to lack of railroad facilities, and they are but little known.

SCENERY. The valleys between the mountain ranges are beautiful and the high peaks of the Cascades lend an element of grandeur to the scene. Mt. Hood near the northern border rises with its white crown like a giant sentinel to guard the Valley of the Willamette. The cascades and rock formations on the Columbia River are remarkable for their beauty, and the Columbia is considered to have the grandest scenery of its kind in America. The canyon of the Snake River is considered by some to rival the Grand Canyon of the Colorado. Many other streams form canyons and gorges of greater or less interest. Crater Lake in the southwestern part of the state is one of the world's natural wonders. The lake is set in the crater of an extinct volcano, more than five miles in diameter, and the surface of the water is over 1000 ft. below the rim of the crater. This beautiful lake has been enclosed in a national park.

CLIMATE. Oregon has an east to west rather than a north and south climate. Western Oregon has an equable climate with a mean summer temperature of 64°. There are a few hot days but the periods of extreme heat are of short duration and the nights are always cool. The winters are mild and characterized by long spells of rainy weather. The mean temperature for the winter is 40°. In this part of the state the rainfall is heavy, being more than 44 inches. Snow is so rare in the valleys as to inspire a

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sense of wonder among the young people. The snow remains only a few days except in the mountains. In February and March there are many days of delightful crisp, sunny weather. The climate of Eastern Oregon is subject to greater extremes of heat and cold. The winds from the Pacific lose their moisture in crossing the mountains, and the rainfall is light, varying from 22 inches to 9 inches. The average summer temperature is 75°. The mean winter temperature is 38.5°. The average snowfall is 38 inches. In general the atmosphere of this part of the state is dry and clear and the region has many bright, sunny days.

MINERALS AND MINING. There are valuable gold mines in the Blue Mountains, and their annual output of gold amounts to about $4,200,546. There are also important silver mines in this locality. Copper, iron and nickel are found in the southwestern counties. Bituminous and lignite coal occur in numerous places, and building stone and clay suitable for brick are found in nearly all parts of the state.

FORESTS AND LUMBER. It is estimated that one-fifth of the standing timber of the United States is in Oregon. Oregon has the largest forests of any state in the Union. On the Coast Range and on the western slope of the Cascade Mountains are dense forests of yellow and sugar pine, yellow and white fir, red and white cedar, spruce, juniper and tamarack. The forests are remarkable for their size. Cottonwood, birch, oak, maple and other hard woods occur in the valleys. Lumbering is one of the most important industries in the state; the annual output of lumber amounts to about $30,000,000. The chief centers are Portland, Astoria, Eugene, Springfield and Coos Bay region.

AGRICULTURE. The equable climate, abundance of rain and the fertile soil make ideal conditions for agriculture in Western Oregon, and conditions are equally good in Eastern Oregon where water can be obtained. The great valley between the Cascade and Coast ranges is the most densely populated portion of the state, and all land available for cultivation is here practically under tillage. In Western Oregon the farms seldom exceed 80 acres, and intensive farming is practiced, but in Eastern Oregon the farms are larger.

Soil. In Western Oregon the soil is a clayey loam, black and gray in color. A red "shot" clay is also common in the foothills. Along the streams a sandy loam is found. In Eastern Oregon the soil is formed by decomposition of volcanic rock. In all parts of the state the soil is fertile and produces abundant crops when sufficient water is available.

Products. There is a great variety of products. In Western Oregon alfalfa, clover, timothy and vetch are grown for hay and forage. Wheat, oats, hops and all kinds of vegetables are also grown in large quantities. The western and southern regions and sections along the Columbia River are especially suitable for raising fruit, and in these sections large quantities of apples, peaches, pears, plums, cherries and small fruits of all sorts are raised. Both the soil and climate are especially suited to fruit growing; in these localities the product is of excellent quality. In Eastern Oregon wheat and other cereals are raised in large quantities, while the center of the state is well suited to grazing.

Live stock is an important factor, large numbers of cattle, horses and sheep being found within the state. In some localities Angora goats can be raised with profit and these animals are being introduced. In Western Oregon dairying is an important branch of agriculture and this is one that is constantly growing. Poultry raising is also profitable. The demand of the home markets for dairy products, poultry and eggs is much greater than they can supply.

FISHERIES. The Columbia River has long been famous for its salmon, and these fish are taken in large quantities in the lower part of the stream. The salmon fisheries and allied industries give employment to about 8000 men; the yearly income from this source is about

$6,000,000. Hundreds of tons of these fish are shipped to Eastern markets and European countries each year. Salt-water fish including halibut and sturgeon are taken off the coast. Oyster fisheries are of some importance.

MANUFACTURES. The production of lumber and lumber products is the leading manufacturing industry. Next to this are the canning of salmon and all industries allied with the salmon fisheries. Flour and grist mills are widely distributed through the state. At Oregon City are some of the largest pulp and paper mills in the country. Machine shops and foundries are located wherever there is sufficient demand for their products. In the fruit-growing sections there are numerous canning establishments. Portland is the chief manufacturing center and has a variety of manufacturing industries. The available water power of the state is practically unlimited.

TRANSPORTATION AND COMMERCE. The Columbia River is navigable for ocean-going vessels as far as Portland and for smaller vessels as far as the Dalles. Long stretches above this point are used as waterways. The stupendous government improvements at Celilo will soon be completed, giving an open river of great commercial value to the border of Idaho. The estuary at the mouth of this stream forms a large landlocked harbor. Smaller harbors are found at Coos Bay, Florence, Newport and Tillamook. The northern and western parts of the state are well supplied with railways. The Spokane, Portland & Seattle, jointly owned by the Great Northern and the Northern Pacific, follows the north bank of the Columbia River to Portland; and a line of the Washington & Oregon Railway and Navigation Company system enters the state at about the middle point of its eastern boundary and extends in a northwest direction until it reaches the Columbia River, which it follows to Portland. Each of these lines has a number of branch lines extending into Eastern Oregon, and the Hill System has a line under construction which, when completed, will extend across the state by way of the Valley of the Deschutes. The Southern Pacific has lines extending north and south through Western Oregon. One of these is a trunk line which connects Portland with San Francisco. Another is being rapidly extended across the state from the eastern border. Both the Hill and the Harriman systems have electric lines of some 200 m. of tracks.

The commerce is extensive. Large quantities of lumber and lumber products are shipped to all parts of the country. Portland is the greatest wheat-shipping port on the Pacific coast. Fruit, canned goods, live stock and wool constitute the chief agricultural products sent to Eastern markets. Manufactured goods, machinery and foodstuffs are imported. Portland is the chief railway and commercial center.

GOVERNMENT. The Constitution was adopted in 1859 and has received a number of important amendments. Woman suffrage was adopted in 1912. The executive department consists of a governor, secretary of state, treasurer, state printer and superintendent of public instruction, each elected for four years. The Legislature consists of a Senate, the membership of which cannot exceed 30, and a House of Representatives whose membership is limited to 60. Senators are elected for four years and representatives for two years. Sessions are biennial.

The judicial department consists of a Supreme Court of 7 judges elected for six years; Circuit Courts in the various judicial circuits into which the state is divided, each of which is presided over by a circuit judge elected in his own district; and County Courts presided over by county judges, who also have probate jurisdiction.

EDUCATION. The state has a large school fund which is constantly increasing from the sale of school lands. An excellent system of public schools is maintained. The state superintendent of public instruction has the general direction of the school system and the schools of each county are under the

supervision of a county superintendent. The state university at Eugene is at the head of the educational system. The state agricultural college is at Corvallis and the state normal school is at Monmouth. The leading educational institutions not under control of the state are Willamette University at Salem; Pacific University at Forest Grove; Mt. Angel Academy at Mt. Angel; Albany College at Albany; McMinnville College at McMinnville; Pacific College at Newberg; Dallas College at Dallas; and St. Helen's Hall, Columbia University and the Reed Institute at Portland.

STATE INSTITUTIONS. The charitable and penal institutions of the state consist of a hospital for the insane, schools for the deaf and blind, a state penitentiary, a boys' reform school and a state tuberculosis sanatorium, all located at Salem.

CITIES. The chief cities are Salem, the capital; Portland, Astoria and Eugene.

HISTORY. Oregon, possibly the Algonquin "beautiful water" as first applied to the Columbia River, was visited along the coast by Drake in 1579, at Nootka Sound by Captain Cook in 1778, and again along the coast and up the Columbia River by Robert Gray and by Vancouver in 1792. Originally, Spain claimed the region by virtue of explorations dating back to 1543. The United States did likewise because Robert Gray, 1792, in the ship *Columbia*, discovered the Columbia River, which Lewis and Clark, 1805, explored. Russia, France and Great Britain also claimed the territory. In 1811 John Jacob Astor established Astoria, which the British captured in 1813. It was returned to the United States by the Treaty of Ghent in 1814. By the Convention of 1818, extended in 1827, it was held under a system of joint occupancy and control. In 1834 Jason Lee and a few associates founded a mission in the Willamette Valley. In 1836, Whitman, Spalding and their young wives, who were the first white women to cross the Rockies, established a mission in the Columbia Valley. Later, when the United States declared "Fifty-four forty or fight," and Great Britain wanted the land down to the Columbia River, a treaty, 1846, settled the boundary at 49°. Regular settlements by home builders began in Oregon in 1842. The pioneers made the four to six months' march across the plains. This Oregon Trail was used by the annual cavalcades for many years. Oregon was organized a territory, 1848, though not without much opposition, because of its remoteness. In 1859 it entered the Union. Oregon's bounds then had their present position. Indian outbreaks and isolation alone have interrupted the state's steady prosperity. Laws of 1905, later amended, provide for the popular nomination of senators and do away with party conventions. Consult Lyman's *History of Oregon* or Schafer's *Pacific Slope and Alaska.*

GOVERNORS. John Whiteaker, 1859-1862; Addison Crandall Gibbs, 1862-1866; George Lemuel Woods, 1866-1870; La Fayette Grover, 1870-1877; Stephen Fowler Chadwick, 1877-1878; William Wallace Thayer, 1878-1882; Zenas Ferry Moody, 1882-1887; Sylvester Pennoyer, 1887-1895; William Paine Lord, 1895-1899; Theodore Thurston Geer, 1899-1903; George Earle Chamberlain, 1903-1909; Frank W. Benson, 1909-1911; Oswald West, 1911-1915; James Withycombe, 1915-1919; Ben W. Olcott, 1919—.

Oregon, The, a famous battleship of the American navy, built at San Francisco in 1891. With a tonnage of 10,524, it can reach a speed of 17 knots an hour, and carries four 13-inch guns, eight 8-inch, four 6-inch and 31 rapid-fire machine guns. It cost about $3,250,000. At the opening of the Spanish-American War, the *Oregon* was ordered from San Francisco to Key West, and between March 19 and May 24 covered 16,000 m. with no mishap. While in Rio de Janeiro, Captain Clark received word that the Spanish torpedo boat *Temerario* had left Montevideo to destroy the *Oregon*. However, no attack was made. In the Battle of Santiago, July 3, the speed

of the *Oregon* made it conspicuous. It forced the *Cristobal Colon* ashore to escape destruction from its 13-inch shells, and doubtless prevented the escape of the *Colon* and the *Vizcaya.* Following the war the *Oregon* went to Manila.

Oregon, University of, at Eugene (1872). The university maintains a graduate school, a summer school and schools of law and medicine. Its departments include the college of literature, science, commerce, journalism, education, the college of science and architecture and a school of music. Its library contains over 85,000 volumes. The enrollment in all departments is about 1900.

O'Reilly, *O' Ri' ly,* **Charles** (1846-), a Canadian physician, born in Ontario and educated at McGill University. He was resident physician at the Hamilton City Hospital from 1867 to 1875 and medical superintendent at the Toronto General Hospital from 1875 to 1905. Moreover he was examiner in clinical medicine for Toronto and Trinity universities for long periods. Dr. O'Reilly, who is a hospital expert, is responsible for the first Canadian ambulance.

O'Reilly, John Boyle (1844-1890), an eminent Irish-American poet and journalist, born at Dowth Castle, Ireland. After working in a printing office he became a newspaper reporter and went to London at the age of 18 as an agent for the Fenian Society. In 1865 he enlisted in a British regiment and was soon tried for high treason because he attempted to induce the Irish soldiers to revolt. His sentence to penal servitude for 20 years because of this offense came to an end in 1869 when he made his escape from the Australian colony and went to America. He was editor of the *Pilot* from 1870 until his death, founded the Papyrus Club of Boston, and remained loyal to the Fenians throughout his life, taking part in the Fenian Raid into Canada. He wrote *Songs from the Southern Seas and Other Poems, Statues in the Block and Other Poems, America* and *Moondyne: A Story from the Under World.*

O'Rell', Max. See BLOUET, *Bloo" eh',* PAUL.

Orestes, *O res' teez,* according to Greek legend a son of Agamemnon, King of Mycenæ, and of Clytemnestra. His mother became enamored of Ægisthus and conspired with him to kill Agamemnon. They then took possession of the kingdom. Orestes' life was saved by Electra, his sister, who sent him to his uncle, who was King of Phocis. Here Orestes grew to manhood with the King's son, Pylades, with whom he formed a life-long friendship. Orestes was frequently reminded by Electra of his duty to avenge his father's death. When grown to manhood he consulted the oracle at Delphi, which encouraged him in his purpose. He then visited his father's tomb, made himself known to Electra and went to Argos, where, by pretending to be a messenger from the King of Phocis, he was admitted to the presence of Ægisthus and Clytemnestra, both of whom he killed.

The people were horrified by his act and Orestes was driven by avenging deities from land to land. Finally he made a second appeal to the oracle and was informed that he would be forgiven if he would bring a statue of Diana from Tauris to Greece. He found that his sister, Iphigenia, was priestess in the Temple of Diana at Tauris, and they returned home in safety. See AGAMEMNON; IPHIGENIA.

Or'gan, a wind musical instrument. Organs are of two general classes, pipe organs and reed organs. The pipe organ is the type generally found in large churches and convention halls, and is the largest and most magnificent musical instrument known. The principal parts are the bellows, the wind chest, the sound board, the pipes and the keyboards for both hands and feet. The wind chest contains compressed air, which is forced into it by the bellows, the latter being operated by hand power or by a motor moved by water or electricity. The sound board is attached to the upper part of the wind chest, and is divided into as many grooves as there are keys, so that

it can convey the air to any key desired. The air is admitted to the pipes by operating the keys, each key opening a valve into the pipe with which it is connected. The tone is regulated by a slide called the register. The pipes are of two kinds, known as the flute and the reed pipes. The sound is produced in the reed pipes by the vibration of a metallic tongue or reed; in the flute pipes, by a current of air across the mouth. The pipes are of metal and of wood. The metal pipes are cylindrical, and those of wood are shaped like a long, narrow box. The pitch is determined by the length of the pipe, and the quality of tone by the material of which it is constructed and its diameter. Small, short pipes produce the high notes, long, large pipes, the low notes. The pipes are arranged in groups, called stops, and the air is admitted to all the pipes connected with one stop by opening the slide, or register, leading into the part of the sound board which communicates with this set of pipes, each individual pipe being sounded by pressing its key.

In every large organ the pipes are arranged so as to constitute a number of different organs or partial organs. The average church organ contains the great organ, the swell organ and the choir organ. To this the solo organ is sometimes added. The echo organ consists of a small organ usually placed at some distance from the large one. The average church organ contains two rows of manuals, or keys, and one set of pedals which play the pipes producing the low tones, or bass notes. The stops are a series of pipes placed above each slide. The chief stops are the *open, stopped* and *double diapasons; the principal, dulciana, melodia, salicional, flute, trumpet, clarion, bassoon, oboe* and *vox humana.*

In some form the pipe organ has been known from early times, being in use by the ancient Greeks and Romans. Among the largest organs are those in the following edifices: Notre Dame of Paris; St. Peter's, Rome; Seville Cathedral, Haarlem; the Auditorium, Chicago; the Tabernacle, Salt Lake City; and Convention Hall, Kansas City, Mo. In the last named the instrument has 10,000 pipes.

Oriental Art. It is only within recent years that books on the history of art have had anything to say about the wonderful art of India, China and Japan. Now that we have a better understanding of their religion and their ideals, we know that their art at least equals our own. To appreciate Oriental art one must be familiar with Eastern habits of thought, and must be able to see their art through the eyes of the Oriental rather than through one's own. Western peoples love form and wish their art to depict what it has to give in imitative, visual terms, as one views a performance on the stage. Oriental art, like music, does not endeavor to imitate the external world, but by the use of harmony, rhythm and the balance of lines, mosaics of tone and color, just as the musician uses the harmony and rhythm of sounds, Oriental art expresses the sublimest emotions. The greatest of Oriental art had its inspiration in Buddhism. When this religion traveled from India to China, many of the forms of Indian art went with it. This is likewise true of Buddhism and art in Korea and Japan. However, China, Japan and Korea used the art of India merely as a suggestion, and each developed out of its own interpretation of the Buddhist religion, an art peculiarly its own. Each of these countries has produced a beautiful style of temple architecture, which in each case has been richly and marvelously decorated in wood carving, which in turn has been enriched with wonderful color and gold.

America is more familiar with Chinese and Japanese art than with that of India or Korea, for the reason that we have in this country some of the greatest masterpieces of the painting of these two countries that are in existence. The Boston Museum of Art has a very notable collection, and in addition to this, Mr. Charles L. Freer of Detroit has brought to this country such examples of Chinese and Japanese painting as are

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not included in the Boston collection, which he has bequeathed to the United States for a national museum. These two collections of Chinese and Japanese art give America a wonderful chance to study this art of the East in all its stages of development.

Chinese pictorial art, when compared with that of Egypt, is modern, whereas in relation to Japanese painting it is quite ancient. There seems to be no trace of any native Chinese art of this kind before the time of Buddhism in China, whither it came from India during the reign of Emperor Ming, in 62 A. D. There are records of paintings of dragons and of Buddhist gods and goddesses that were made for the decoration of temples previous to the seventh century.

In the eighth century there were two famous painters who were employed to do some decorative work for the government. During the Sung dynasty between 960 and 1206 there were many painters, among whom were Li Lung-yen (or Ri-riu-min, as the Japanese know him) and Negan Hwui (or Ganku in Japanese). The former was famous for his Buddhist pictures, his drawings of landscapes, horses and the figure. He is represented in the British Museum by a painting called the *Nirvana of Sakyamuni.* The latter was known as the last of the great masters who so strongly influenced Japanese painting. The Yuen dynasty between 1260 and 1450 had many painters of horses, tigers, and birds, the most famous of which, perhaps, was Chao Meng-fu, whom the Japanese call Cho-su-go. The Ming dynasty between 1450 and 1628, like the Yuen, shows almost an absence of religious paintings, but many landscapes, birds, flowers, animals and figures.

In China and also in Japan, painting was a direct outgrowth of writing. For centuries there was the greatest admiration for the ability to write beautifully; and to write Chinese and Japanese characters is to be able to control the brush to a degree that is impossible to one of Western birth. In learning to write, the Chinese learn to master the painter's chief tool, and it only remains for him to draw objects instead of the characters of writing. The Chinese painter cares little about representing things as they look in the truth of light and shade, perspective, etc., but tests his work by the character, directness and vigor of the lines used. The Chinese painted both on paper and on silk, on which they used either ink or an opaque water color of very durable quality.

The Chinese painter applied his art to such crafts as wood engraving, decoration of pottery, lacquer and embroidery.

Sculpture, except as it is used in decorative wood carving, was not a natural means of expression to the Japanese. It was soon abandoned for the art of the writing brush. Sculpture, therefore, manifested itself early in the history of this art. It is restricted, almost entirely, to huge bronze statues of Buddha, among which are the Buddhas of Nara and Kamakura, the latter of which is a seated figure nearly 50 ft. high. It was completed in 1252, while the former was finished in 750. Besides colossal bronzes there are many wooden temple statues of Buddha and other gods and goddesses. Japanese sculpture is very vigorous in treatment. The sculptured decoration of the temples and temple furnishings is rich in its design and its use of symbols and color.

Japanese painting divides itself into seven distinct movements; namely, the Buddhistic from the ninth to the twelfth centuries; the Yamato-Tosa from the tenth to the fourteenth centuries; the Sesshiu from 1421 to 1507; the Kano from 1400 to 1750; the Okio, or Shijo, from about 1750 to the present period; and the Ukioye from about 1640 to the present time.

The Buddhistic School produced most of the sculpture of Japan and represents the first attempt at painting. It was exclusively religious and was strongly influenced in spirit, treatment and color by the painting of India and China. Its greatest artists were Kanaoka and Hirotaka, both of whom painted temple and

palace decorations. Its colors were rich blues, reds, greens and gold.

The Yamato-Tosa School, though spoken of as one, was in reality two different movements, the first of which was influenced by the Chinese, while the latter was thoroughly Japanese. Most of the great Tosa paintings depict various phases of Japanese feudalism, the life of the court and of the soldier.

The paintings are puzzles to the Westerner until he understands them. The Tosa artist never attempts to show us how a thing looks in a given place and under a given condition of lighting. He never goes to his garden to pluck a flower which he brings to his studio to paint. In painting an iris, he would not draw from the flower but from what he knows of all the flowers of a kind, a knowledge he has been gathering through years of loving observation, striving to depict the spirit of what he draws rather than its form.

The Tosa artist makes the observer feel himself to be looking from a point above the scene. Where houses are shown, the roofs are left off, so that one looks down into the interior and also sees the inside at the same time. The later artists of this school have painted exquisitely, and idealized flowers, birds and other natural forms.

Among the prominent individuals of the Yamato-Tosa group are members of the Minamota and Mitsumoto families; and, later, Nobuzane, a great colorist, Mitsunobu, Mitsuoki and Mitsuyoshi. Tosa color was distinctly Japanese, quite different from that of the Buddhistic School. The predominating colors were gold, white, red, green, yellow and blue, which were used intensely strong, but so broken up and woven together that the result was not glaring but a rich softened gray. The Kano and Sesshiu schools had their inspiration in the calligraphic painting of China.

The next two schools were contempory, and their inspiration was Chinese. They were the Kano and Sesshiu schools, the former of which was founded by Cho Densu, who tried to paint in the style of the Buddhistic artists; his ancestors, however, abandoned this idea and established a new style which was based on the brush line drawing of China. These artists were great designers, and worked for many years in black and white exclusively, but later added color in imitation of the Tosa School. They painted panels, in which, as themes, they used animals, birds, fish, flowers, and trees. Its great masters were Kano Massanobu, Tanyu, Yeitoku and Korin. Korin was a master designer, lacquerer and colorist. Sesshui was the founder of the school that bears his name. He studied in China, and his technique and subjects were similar to those of the Kano School.

The Okio, or Shijo, known as the Naturalistic School, was founded by Okio, who painted such subjects as birds, fish, flowers, trees and landscapes. The realism of Okio was not the same as that of the Western World, which always draws an individual thing in a given moment and light, but was rather a truth to nature that was the result of so thorough a knowledge of nature that it was possible to draw any of her forms without having the thing actually present. Sosen, one of the artists associated with this naturalistic movement, was famous for his paintings of monkeys.

In later years the artists of Japan have been diverted from their national ideals of art by an interest in the art of Europe and America. There, however, are two men still living in Japan, who have endeavored to maintain in their own painting what is best in the ideals of Japanese art; they are Hashimoto Gaho and Ogato Gekko; the former is the chief professor in the Tokyo Academy of Fine Arts.

The Japanese have developed the process of color printing by means of engraving wood blocks to a point of excellence beyond that attained by any other nation. Aside from this wonderful technique, their marvelous design and harmonious color have been the source of inspiration to more than one Western artist; such as Whistler and Monet.

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Wood-block printing in black and white had been practiced in China for many centuries in the printing of the text and in the illustration of books, and it was in that way that it was first used in Japan. In the earlier stages of the art, color pictures were printed in outline and then colored by hand. Gradually the process became perfected, until it was possible to print most delicate and intricate designs and get any desired effect. The great Japanese color prints were nearly all produced between 1680 and 1850, since which time the art has been neglected, the printers having spent their time copying old prints, which were usually bad, for the American and European market.

A few of the great print-artists, in chronological order, are Hishikawa Moronobu, Suzuki Harunobu, Katsukawa Shunsho, Torii Kiyonaga, Utamaro, Utagawa Toyokuni, Hokusai, Shunsen, Kunisada and Hiroshige. The most universal genius of them all, no doubt, was Hokusai, who at one time was a painter, designer and print-artist. Hiroshige is famous for his landscapes. Excepting Hokusai, he was the only one of the print-artists who treated the landscape in any other way than as an accessory for the figures.

Even so concise an article on Oriental art as this one is must not overlook the wonders that have been accomplished in these countries in the handicrafts.

In America and Europe our lives have become so complex and our necessities have so multiplied that we have of necessity turned over to the manufacturer, the making of the many things we use. He, in order to keep business booming, makes a product that will not last too long, and then changes the style as frequently as possible. In the Orient, conditions are different. Life is simpler, fewer things are necessities, and these few things are made by hand by craftsmen who love their work, and who put more into it than time and get pleasure out of it as well as money. The few things that are necessary are chosen with the utmost care, and, being handmade and well made, last a long time. The Chinese and Japanese excel as metal workers, enamelers, lacquerers, wood workers, textile workers, printers and potters. The last-named craft is the only one that will be treated here, and, as we import more of the Japanese pottery than of the Chinese, we will deal with that only.

Japanese pottery is distinguished for refinement of form, varied and wonderfully executed design and unparalleled range of color. The most famous potteries are those of Arita, Kyoto, Kaga, Satsuma and Awari. Satsuma and Arita have produced both pottery and stoneware that compare favorably with anything of the kind that has been made anywhere in the world. The rudiments of this art, as of many others, were learned in China, and the Chinese influence is frequently traceable in the design. Japan is rich in all the materials that are used in the making of pottery and its colors.

In the 13th and 14th centuries there was a preference for the iridescent black, red, brown and dark green of the Raku ware, but late in the 16th century, when the tea ceremony became popular, taste in the matter of pottery underwent a marked change. Ninsei founded kilns that produced Awata, Kiomidzu and Omura wares. Ninsei was very skilled in the use of the brush, and decorated his wares with birds, flowers and human figures in creamy blue, light green and coral glazes. Kenzan and Yeiraku were famous potters who worked during the latter part of the 17th and the early part of the 18th century. Both were great colorists, but somewhat neglected form.

Japanese pottery can best be identified by its color. A soft gray-green is characteristic of the kilns of Sanda-Seiji; grays and salmon of Haji; yellow-brown of Oki; and drip-glazes of Oriba. Satsuma is the most popular of all. It is famous for its soft creamy-white backgrounds and for its soft colors and gold.

The 19th century produced the Bizen ware that is remarkable for its wonderful metallic brown and blue glazes. At

the present time the development of pottery is at a standstill, and many of the kilns are producing inferior articles for the foreign market. See FINE ARTS.

Origen, *Or' i jen,* (about 185-about 254), one of the most famous Greek Fathers of the Church, born in Alexandria, of Christian parents. He was educated at the famous school in his native city, where he studied under Clement. At various times he traveled extensively in Palestine and Arabia, going also to Greece and Rome. By being ordained in Palestine he aroused the bitter animosity of the Bishop of Alexandria, who accused him of heresy and followed him with persecution. Origen therefore went to Cæsarea, where he made the school almost as famous as the one in Alexandria. He died about the year 254 as the result of an injury received from torture in prison during the persecution of the Emperor Decius.

Origen was the most illustrious scholar, teacher and writer who had yet appeared in the Church. In his efforts to express Christian truth in terms of Greek philosophy he was a pioneer in the paths of systematic theology, his most noted work in this direction being *De Principiis.* His book *Against Celsus* is the most valuable early defense of the Gospel in existence. Twenty-seven years were spent in preparing his Hebrew and Greek edition of the Old Testament, the *Hexapla.* In his interpretation of the Scriptures he adhered to the allegorical method, which held that each passage contained one or more senses in addition to the literal meaning. His great labors gained for him the name "Adamantine," and his influence upon the Church was felt for many centuries.

Orinoco, *O" ri no' ko,* a river of South America, one of the three greatest of the continent. It rises on the Sierra Parima uplands, near the frontier of Brazil, flows north and east and empties into the Atlantic Ocean by several mouths near the boundary of British Guiana. It is 1490 m. long.

O'riole, a group of tree birds of the Blackbird Family, common in Europe, Asia and Australia. They are handsome birds and are easily recognized by their yellow and black plumage. In America the name is applied to a different bird.

BALTIMORE ORIOLE; GOLDEN ROBIN; FIREBIRD; HANGBIRD. This beautiful bird is easily recognized by its rich orange breast, under parts and rump, black throat, head and back, the white-barred, black wings and black and orange tail feathers. In size, it is somewhat smaller than the robin. Like some other species, the beautiful males arrive in advance of the females and make their presence known by their clear, melodious whistle and bright plumage. When the female arrives, the wonderful, hanging, woven nest is suspended from an elm, maple or other large tree, generally very high up and at the end of a small branch. The nest forms a bag about seven inches in depth, and is made of fine grass, plant fibers, wool, string or hairs. Sometimes the nest is near a window, and contains brightly-colored threads, which children have placed where the birds could get them. Four to six eggs, spotted and blotched with black and lavender, are laid. During the nesting season large quantities of insects are eaten by the nestlings and the parent birds. This oriole occupies the whole of North America south of the 55th parallel in summer, and in winter migrates to Panama.

ORCHARD ORIOLE. This is another common oriole, which is a trifle smaller than the Baltimore oriole, and has black head, wings, tail and upper back, and chestnut-brown lower back and under parts. The basketlike nest is frequently made in an orchard, and four to six brown-spotted eggs are laid.

In the West and Southwest, several richly-colored orioles live; of these Bullock's oriole is perhaps the most common. It may be known by its orange neck and under parts, its black crown, throat, head and back, the white patch and edgings of wings and the yellow outer tail feathers.

Ori'on, one of the equatorial constellations, the hunter attacking Taurus.

Orion is one of the most clearly defined of all the constellations. It is approximately a parallelogram, but is a little narrower at one end than at the other. The beautiful ruddy star of the first magnitude in the narrower end is Betelgeuse. Diagonally across the parallelogram is Rigel, a splendid blue star of the first magnitude. In the center are three stars, the belt, the "Bands of Orion" mentioned in *Job xxxviii, 31.* See STARS; PLEIADES; TAURUS.

Oris'kany, Battle of, a battle of the Revolutionary War, fought some two miles west of Oriskany, N. Y., Aug. 6, 1777, between 800 Americans under Gen. Nicholas Herkimer and an equal force from St. Leger's army. This comprised Tories under Sir John Johnson and Iroquois Indians under their chief, Joseph Brant. The Americans were on the way to relieve Ft. Stanwix. In a narrow ravine, some eight miles from the fort, they were caught in an ambuscade, which Brant had prepared. The obstinate and sanguinary struggle which ensued soon became a hand-to-hand fight. One-third of the contending forces were killed and Herkimer was mortally wounded when the Tories and Indians finally fled, leaving the field to the Americans. Partly as a result of this battle, St. Leger retired to Canada a short time afterwards.

Ork'ney Islands, a group of islands separated from the northern coast of Scotland by the channel of Pentland Firth. Of the 70 islands, constituting an area of 375 sq. m., about 29 are inhabited. The largest are Pomona, Hoy, South and North Ronaldsay, Burray, Ronsay and Shapinsay. They are generally lowlands with fertile soil, and the climate is mild. Potatoes, barley, oats and turnips are cultivated, and among the industries are sheep, poultry and cattle raising, fishing and the making of hosiery by hand. Kirkwall is the capital. The islands were early inhabited and prior to the tenth century were invaded by Norsemen. The inhabitants are principally of Scotch and Scandinavian origin. Population in 1901, 26,698.

Orleans, *Or" la" ahn'*, the name of two royal families of France. The title Duke of Orleans was first given to Philip, the fifth son of Philip VI of France, in 1344. In 1392 the title passed to Louis, Count of Valois, the younger son of Charles V, who became founder of the House of Orleans-Valois, and was an important figure during the period of the Hundred Years' War. His eldest son Charles (1391-1465) succeeded him, and was taken prisoner by the English at Agincourt, spending 25 years in captivity. He was noted as a poet. His son Louis, the succeeding duke, ascended the French throne in 1498 as Louis XII, and the Duchy of Orleans was merged with the crown. The title was subsequently held by the younger sons of Francis I and Henry II until 1574, when the last male representative of the House of Valois ascended the throne as Henry III.

The title passed to the Bourbons in 1626, when Louis XIII created his brother, Jean Baptiste Gaston, Duke of Orleans. Upon the death of this prince in 1660 without male issue, the title was conferred the following year by Louis XIV upon his younger brother, Philippe (1640-1701), founder of the present family of Orleans-Bourbon. His son, Philippe, Duke of Orleans (1674-1723), was Regent of France during the minority of Louis XV. The fifth incumbent of this line was Louis Philippe Joseph (1747-1793), known as Egalité, great-grandson of the Regent, who became Duke of Orleans upon the death of his father in 1785. He quarreled with the court, became a member of the Assembly of Notables in 1787, joined the Jacobins in 1789, assuming the name of Citizen Philip Egalité, and voted with the Mountain for the death of the King. In 1793 he was convicted of conspiracy by the Revolutionary Tribunal, although without sufficient evidence, and was executed the same day. His eldest son, Louis Philippe, was King of France from 1830 to 1848. The grandson of the latter, Louis Philippe Robert, Duke of Orleans, born in 1869, is the present head of the

family and pretender to the throne. See LOUIS PHILIPPE.

Orleans, Maid of. See JOAN OF ARC.

Or"nithol'ogy, the scientific study of birds, their classification, habits, distribution, etc. See BIRDS, subhead *Classification.*

Ornithorhynchus, *Aur" ni tho rin' kus.* See DUCKBILL.

Orontes, *O ron' teez,* a river of Syria, now called Nahr el-Asi. It rises in the Lebanon Mountains, flows northward as far as Antioch, thence westward to the Mediterranean. Its length is about 250 m. It is not navigable, but is noted for the beautiful scenery along the lower part of its course.

Orpheus, *Or' fus,* in Greek myths, son of the Muse Calliope by Apollo, from whom he received a golden lyre upon which he played so exquisitely that even beasts and inanimate nature were enchanted by his melodies. When, shortly after their marriage, his bride, Eurydice, died from a snake bite, Orpheus descended to Hades, armed with his lyre alone. But so mournfully did he sing his grief to the infernal rulers, Pluto and Proserpine, that they agreed to restore his wife to him on condition that he cast not even one glance at her until he had conducted her up into the region of light. Unable to deny himself one comforting look, he saw Eurydice snatched away from him just as they were on the verge of the upper world.

A band of Thracian maids, crazed by rites of Bacchus, seized on Orpheus, who had ignored them through grief for his lost Eurydice, and tore him limb from limb. Gathering the pieces of his body, the Muses buried them in Libethra. There, on his grave, the nightingale sings his sweetest lay. Jupiter placed the lyre of Orpheus in the heavens, where it forms the constellation Lyra.

Orthoceras, *Or thos' er as,* a genus of Cephalopods, or marine animals, having coiled shells. They first appeared in the Upper Cambrian system, and fossil remains of several hundred species have been discovered in the Paleozoic formations of all parts of the world. The shell somewhat resembles that of the nautilus, but is straight and cone-shaped. The interior of the shell is divided into a succession of chambers by a series of transverse walls, each with an opening in the center. Remains of 200 species have been discovered, presenting great variability as to size. Shells the size of a barrel have been found, which must have been inhabited by an animal from 12 to 15 ft. long.

Orthoclase. *Aur' tho klase.* See FELDSPAR.

Orthop'tera, or **Straight-Winged Insects,** a group of Insecta, which includes the cockroaches, locusts, grasshopper, crickets, katydids and others. The class takes its name from the straight forewings of the grasshopper, but the name is not thoroughly comprehensive, since the walkingstick, also a member of this group, has only rudimentary wings, and others of the class have wings that would scarcely be called straight. The Orthoptera differ from the insects of other groups in having biting mouth parts and an incomplete metamorphosis (See INSECTA). The Orthoptera are destructive insects, especially if occurring in large numbers, as they are apt to do in certain seasons. See CRICKET; KATYDID; GRASSHOPPER; COCKROACH; MANTIS.

Or'tolan, a name applied to several birds which are used as food, the most common being the European garden-bunting, a member of the Finch Family. These birds, which are about the size of the English sparrow, are captured in nets, and confined in dark rooms where they are fattened by gorging on grains and spices until they weigh about three ounces. They are then ready for the market. The bobolink and the sora rail are also known under this name when sold in the market.

O'sage Or'ange, or **Osage,** an ornamental American shrub of the Nettle Family, found native in the region of the Osage River, from which it derives its name. It is a small, bushy tree, which spreads quickly by means of running roots. The branches are tough and short

and grow so thickly that they make an almost impenetrable hedge. The leaves are oval and shining. The flowers are of two kinds: fertile, or those which will bear fruit; and sterile, or those which will not. Those of the first kind grow in long clusters, and the second in a close head. The divisions of the flowers are in four unequal parts. The fruit is a fleshy ball, orange-yellow when ripe and much like the orange in appearance, but with a rougher surface. The pulp is dry and bitter to the taste. The heartwood of the osage is red and is used in the production of a dye; the outer wood is yellow and tough and was a favorite with the Indians for making bows; for this reason it was called by them *bois d'arc*.

Osage, *Q saje'*, **River,** a tributary of the Missouri. It rises in the eastern part of Kansas, flows eastward through Missouri and joins the Missouri River a few miles below Jefferson City. Its length is about 500 m., and it is navigable for about 200 m. for small vessels.

Osaka, *O' za kah,* or **Ozaka,** a city of Japan on the Island of Hondo on the shore of Osaka Bay, 37 m. s.w. of Kyoto. It is popularly known as the "Venice of the East" because of the canals spanned by numerous bridges. Among the public buildings are the Shinto and Buddhist temples, the castle founded by Hideyoshi in 1583, the enclosed palace, the arsenal and the mint. Osaka is an important railroad center, and a fairly commodious harbor has been constructed. The industrial establishments include shipyards, ironworks, sugar refineries and cotton-spinning mills. The town was begun by Rennio Shonin in 1495-96, who built a temple on the present site of the famous castle. In 1583 Hideyoshi made Osaka his capital, and it was opened to foreign trade in 1868. Population 1,460,218.

Oscar, *Os' kar*, **II** (1829-1907), King of Sweden and Norway. He studied at various famous universities and then travelled extensively. In 1857 he married Sophia, daughter of the Duke of Nassau, and in 1872 he succeeded his brother Charles XV as King of Sweden and Norway. His prosperous reign was marked by the development in railroad building, manufactures and agriculture in both countries. When Norway and Sweden were separated in 1905, the King's tactful policy prevented war between the two countries. He published an autobiography of Charles XII and translated Goethe's *Faust* and *Tasso*.

Osceola, *Os" e o' la,* an Indian chief, the son of an English trader and of a Creek Indian woman. Removed to Florida, he became chief of the Seminoles and stubbornly resisted the attempts of the United States to transfer the tribe to Arkansas. After several years of warfare he was captured by General Jessup and imprisoned in Ft. Moultrie, Charleston, S. C., until his death in 1838. See SEMINOLE.

Osh'kosh", Wis., a city and county seat of Winnebago Co., 49 m. s.w. of Green Bay and 75 m. n.w. of Milwaukee, on the west shore of Lake Winnebago at the mouth of the Upper Fox River, and on the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Minneapolis, St. Paul & Sault Ste. Marie and other railroads. Lines of river steamboats connect with the Wisconsin River at Portage and with the Great Lakes at Green Bay. Interurban electric lines also connect Oshkosh with Fond du Lac, Omro, Neenah, Menasha, Appleton, De Pere, Green Bay and other towns and cities. The city lies on both sides of the river, here spanned by a number of bridges, and reaches back to Lake Butte des Morts, an expansion of the river. Oshkosh has an important trade and the city is the commercial center for a considerable portion of central Wisconsin. Lake Winnebago is a noted summer resort and the annual regattas of the Inland Lake Yachting Association take place there. There are also Chautauqua grounds on the lake front. Oshkosh has well-paved and parklike streets and many beautiful residences. North Park, containing 60 acres, located on the lake front, is the most noteworthy of the park system.

Among the public buildings are the Harris Public Library, the Orville Beach Manual Training School, county courthouse, city hall, Federal Building, banks, an opera house and substantial business and wholesale houses. There are about 39 churches. The educational institutions include a state normal school, the largest in the state, a manual-training school, conservatory of music, a public library and museum, a high school, public and parochial schools, several business colleges and a school of telegraphy. Among the benevolent and charitable institutions are St. Mary's and other hospitals. The Northern Hospital for the Insane, the county hospital for the incurable insane and the county almshouse are located about three miles from the city. Oshkosh has extensive lumber and flour mills, sawmills, carriage and wagon factories, furniture factories, agricultural-implement works, sash, blind and door factories, match works, shingle mills, vinegar works, foundries and machine shops, marine-engine works, boat yards, horseshoe and thrashing-machine factories and grass-twine works. Farming and dairying are important industries in the vicinity.

The first permanent settlement here was made in 1827 and the settlement was known as Saukeer. The name was changed to Oshkosh in 1840 in honor of a Menominee Indian chief who befriended the early settlers. A city charter was granted in 1853. Population in 1920, U. S. Census, 33,162.

Osier, *O' zher,* or **Basket-Willow,** a low, bushy shrub of the Willow Family, whose twigs, on account of their toughness and pliability, are widely used in basketry. The shrub is a native of Europe but is frequently found in the United States on low ground and along the banks of streams, where its growth forms a close thicket. The wood is light and soft and covered by a light green, bitter-tasting bark. The leaves, like those of all willows, are long and narrow; in color they are light green and in some climates they are evergreen. The flowers, which appear before the leaves, are often the earliest spring blossoms. There are two kinds of flowers: one of these is borne in short, scaly heads, not at all conspicuous; the other, rather more attractive, is borne in fluffy catkins with bright yellow, protruding stamens. These flowers depend upon insects to pass the pollen on to the seed-bearing flowers and so are provided with honey-bearing cells and have a slight fragrance. The fruit is a pod, which opens by splitting in halves, disclosing many small seeds, bearing tufts of cottony down.

Osi'ris (called the Good), in Egyptian myths, god above all, husband and brother of Isis and father of Horus. After having rescued the Egyptians from barbarism and instructed in agriculture and many arts and sciences not alone these people but various nations in Asia and Europe, he was murdered by his brother, Typhon. Thereupon he became judge of the dead. Moreover, Osiris represented the sun below the horizon. The soul of Osiris was fabled to be in the sacred bull, Apis. He was represented as a mummy in human form, wearing a tall cap and bearing a flail and crosier. His festival resembled that of Bacchus.

Os"kaloo'sa, Iowa, a city and the county seat of Mahaska Co., 62 m. s.e. of Des Moines, on the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy, the Iowa Central and other railroads. The town also has interurban electric-railway service. Important industries are mining, farming, stock raising and manufacturing. The manufactures include flour, packed meat, iron and brass goods, steam and hot-water heaters, wagons, woolen goods, cement blocks, sewer pipe and vitrified brick. At Oskaloosa takes place the annual meeting of the Iowa Society of Friends, and here are located Penn College, a Friends' institution, and the Iowa Christian College. At the University Park, a village adjoining Oskaloosa, is the Central Holiness University, at which the annual camp meeting of the National Holiness Association is held. Oskaloosa has a public library and a fine post-office build-

ing. It also contains a statue of Mahaska, a chief of the Iowa tribe. The place was settled in 1843 and ten years later was incorporated. Population in 1920, U. S. Census, 9,427.

Os'ler, Sir William (1849-1919), a celebrated physician, born in Bondhead, Ontario, and educated at Trinity College, Toronto, McGill University, University College, London, and the universities of Berlin and Vienna. He was professor of the institutes of medicine at McGill from 1874 to 1884 and professor of clinical medicine at the University of Pennsylvania from 1884 to 1889, when he there became professor of the principles and practice of medicine and physician-in-chief at Johns Hopkins Hospital. In 1905 he became honorary professor of medicine at Johns Hopkins and regius professor at Oxford. Dr. Osler has been an extensive writer on professional subjects.

Os'mium, an element of the platinum group, closely resembling platinum. It is a lustrous, silver-white metal having a high melting point and oxidizing only at high temperatures. Osmium is the heaviest known substance. It is found chiefly in platinum and iridium ores and is used as an alloy of these metals. With platinum it is used for making the standard measures of length and weight, and with iridium it is used in making compass bearings and tips of gold pens. Electric-light filaments are frequently made of pure osmium. Osmium was discovered by Tennant in 1804.

Osmo'sis, a process of diffusion whereby two liquids, of different kinds and separated by an animal membrane, interchange until the densities of the two become more nearly the same. A simple experiment illustrating osmosis is easily performed. If the shell be removed from the small end of an egg so carefully that the thin membrane is not broken, and this egg is set in a beaker of salt water, after a time it may be noticed that a part of the egg has become mixed with the salt solution, and an examination will show that even more of the salt solution has entered the egg, although there are no visible pores in the membrane. It is by means of osmosis, sometimes called dialysis, that the lymph from the alimentary canal enters the capillaries, while the blood gives up its waste product; and in the same way plants are nourished by the sap. The inward flow of a liquid, as the lymph into the capillaries, is called endosmosis; and the outward flow, as that of the waste products out from the capillaries, is termed exosmosis.

Os'prey, or **Fish Hawk,** a large bird of the Hawk and Eagle Family. The hooked beak, strong feet with their sharp talons, white under parts, grayish-brown upper parts and tail with black and white bands easily distinguish this bird. The nest is placed in a variety of situations, on the ground, on cliffs or in trees, and is made of sticks and other material, lined with corn leaves, seaweed, bark, etc. It contains three eggs spotted more or less heavily with brown. The same nest is used year after year, and in some localities the ospreys nest in large colonies. The food consists entirely of fish, which the bird catches with great dexterity, often diving into the water from a considerable height. The osprey breeds from Alaska to Mexico and migrates to the West Indies and northern South America.

Ossian, *Osh' an*, a legendary character of Celtic literature. According to tradition he was the son of Finn, and belonged to Ireland and to the third century A. D. He commanded the Fenians who were conquered in the Battle of Gabhra in 283. Poems about him spread over Ireland and Scotland, and he has been popularized again by the recent Irish literary revival. For the Ossianic revival in Scotland see MACPHERSON, JAMES.

Os'sining, N. Y. (formerly Sing Sing), a city of Westchester Co., 31 m. n. of New York City, on the east bank of the Hudson River where it expands into Tappan Bay, and on the New York Central & Hudson River Railroad. It is picturesquely located on rising ground and has many handsome residences of New York business men. The Sing Sing

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INTERESTING BIRDS

RUBY-THROATED HUMMING BIRD

BARN SWALLOW

TREE SWALLOW

OSTRICH

CARRIER PIGEON

CHIPPING SPARROW

SONG SPARROW

ENGLISH SPARROW

COWBIRD

CHESTNUT-SIDED WARBLER

State Prison located here is one of the most prominent in the United States. There are several private academies and boarding schools. The arch of the Croton Aqueduct, 88 ft. in span and 70 ft. above water, with an arched highway bridge, is one of the various points of interest. There are manufactories of iron, machinery, leather, medicinal articles, etc. It was settled in 1700 on part of the Phillipse Manor and incorporated in 1813. The name was changed to Ossining in 1901, the former name, Sing Sing, having become objectionable on account of its association with the prison. Population in 1920, U. S. Census, 10,739.

Os'soli, Marchioness. See FULLER, SARAH MARGARET.

Ostend' Man"ifes'to, a noted dispatch signed at Ostend, Belgium, Oct. 9, 1854, by James Buchanan, John Y. Mason and Pierre Soulé, at that time the United States ministers to Great Britain, France and Spain respectively. These ambassadors met in the city of Ostend, at the suggestion of President Pierce, to discuss the Cuban question. The dispatch sent to the United States Government declared that the purchase of Cuba from Spain by the United States would be desirable, but that if Spain refused to sell, the United States should forcibly acquire the island. The Ostend Manifesto, with certain filibustering expeditions, which had sailed from Southern ports against the islands of the Spanish West Indies, especially Cuba, increased the agitation in the free states against the slave power, which the North believed was attempting by these measures to extend slave territory. This declaration nearly severed diplomatic relations with Spain. It also aroused adverse sentiment throughout Europe and was not approved in the United States in the platforms of either party.

Osteopathy, *Os" te op' a thy,* the practice of curing disease without the use of drugs, based upon the principle that perfect health depends upon perfect anatomical structure. Any imperfections of structure tend to retard the circulation of the blood and hence hinder it from carrying away diseased tissue or dead cell-matter. Osteopathy seeks to locate the displacement of bone, muscle or nerve which has caused the difficulty and, by mechanical manipulation, to restore it to its normal position and the body to health. Germ disease, it is claimed, cannot successfully attack a body which is normal, since the body contains within itself the power to combat the disease. The founder of the osteopathic school of medicine was Dr. Andrew T. Still of Kansas. In 1892 the first school of osteopathy was opened at Kirksville, Mo.; since then many other colleges have been established and the science has advanced to such an extent that all medical schools teach certain departments of osteopathic treatment. Most physicians, whether homeopathic or allopathic, sanction osteopathic treatment in many diseases but object to its use in all, and in this most modern osteopaths agree.

Os'trich, a bird of the Ostrich Family, to which the emu and the cassowary belong. A full-grown male is from seven to eight feet tall and weighs from 200 to 300 lb. Such a bird can easily pluck fruit from a branch ten feet from the ground. The head, neck and legs are bare, and the eyes are so placed that the bird can see in all directions. The body of the male is black, with white plumes in the wings and tail. The plumage of the female is grayish-brown. The feet have but two toes. Ostriches cannot fly but they are very swift runners, outdistancing the fleetest horse. They are so strong that now and then one in captivity is trained to carry a boy or man on its back.

The males are fierce fighters and dangerous antagonists, using both beak and feet in attack or defense. The bird kicks by striking forward, and a blow from the foot is sufficient to inflict serious, if not fatal, injury. The nest is a hollow in the sand. In the wild state the eggs of several females are gathered in one nest, and the male sits upon them at night, but during the day they are incubated by the heat of the sun. In captiv-

ity, however, the nesting habit is changed. The birds are usually kept in pairs, each pair in a separate inclosure. From 15 to 18 eggs are laid, and the female sits upon them during the day and the male at night. This is doubtless due to the fact that ostrich farms are located in regions where the heat of the sun is not sufficient for incubation. The period of incubation is 40 days. The eggs have an ivory-white appearance and weigh about three pounds each; the shell of an ostrich egg will hold the contents of 30 hen's eggs.

Ostrich Farming. For a long time ostrich plumes have been used for decorative purposes and years ago the demand for these plumes became so great that it could not be supplied by hunting wild birds. This led to raising ostriches in captivity. Ostrich farming has reached its greatest development in the Cape of Good Hope Province, where more than 275,000 birds are now on farms. Ostrich farms are also found in California, Arizona, Florida and Texas.

When ready for plucking, the bird is placed in a three-sided inclosure and a hood slipped over its head. The large feathers are clipped with scissors, so that the ostrich suffers no pain from the plucking. As long as the hood remains over the eyes, the bird is perfectly quiet. The largest plumes are taken from the wings and tail, the black and white coming from the male and the gray from the female. A bird yields from $30 to $60 worth of plumes from a plucking, and they are usually plucked three times a year.

Os'trogoths. See Goths.

Oswe'go, N. Y., county seat and port of entry of Oswego Co., 35 m. n.w. of Syracuse, on Lake Ontario at the mouth of the Oswego River and on the New York, Ontario & Western, the New York Central & Hudson River and the Delaware, Lackawanna & Western railroads. The city is regularly laid out and fine drives skirt the river and the lake shore. The Gerritt Smith Library and a state normal and training school are located here. Among the points of interest are the United States Life-Saving Station, state armory, arsenal, etc. The old French fort possesses historic interest. Oswego has a good harbor which is formed by the mouth of the river, and it has large shipments of lumber, grain and coal. It has several foundries, machine shops, match factories, oil works, manufactories of flour, oil-well supplies, car springs, textiles and knit goods and extensive starch factories. Owing to its location, Oswego was an important post in King George's War and the French and Indian War, and in 1759 it was the center of military operations in this part of the country, and the point from which General Amherst with 10,000 men started to meet Wolfe at Quebec. Oswego was incorporated in 1828 and chartered as a city in 1848. Population in 1920, U. S. Census, 23,626.

Oswego, Battle of, an engagement of the War of 1812, fought May 5, 1814, at Oswego, N. Y. Sir James Yeo, with about 3000 soldiers and marines, attacked the fort garrisoned by Colonel Mitchell and 300 men. The first attack was repulsed by a cannon on the shore of Lake Ontario, but the second, May 6, proved successful. The garrison retreated up Oswego River, and the British left, after having burned the barracks and having captured the supplies and a war vessel. The Americans lost 69 men; the British, 19 killed and 75 wounded.

O'tis, Elwell Stephen (1838-1909), an American soldier, born at Frederick, Md. He graduated from Rochester University in 1858, completing a course in law at Harvard in 1861. In 1862 he became captain of the 140th New York Infantry, and led this force through many important battles. He was wounded in 1865 and discharged with rank of brigadier-general of volunteers. The year following he was made lieutenant-colonel in the regular army and served in the West from 1867 to 1885, during the last four years of that time organizing and managing the Leavenworth School of Infantry and Cavalry. From 1885 to 1890 he was commandment at Assini-

boine, Mont.; from 1890 to 1893 was superintendent of the recruiting service, with rank of brigadier; commandant of the Department of Columbia from 1893 to 1897 and of the Colorado from 1897 to 1898; and was then made commander of the United States forces in the Philippines, and also military governor. In 1900 he was promoted to the rank of major-general and was given command of the Department of the Lakes, retiring from active service in 1902.

Otis, James (1725-1783), an American patriot, born at West Barnstable, Mass. He graduated at Harvard in 1743, was admitted to the bar, and soon rose to the foremost rank in his profession in Boston, gaining an enviable reputation for eloquence, learning and integrity. In 1761, when Otis was advocate-general for the Crown, England attempted to enforce the navigation acts by the means of search warrants known as Writs of Assistance, and Otis resigned rather than be a party to the enforcement of the writs. He argued the cause of the colonies before the court in a remarkable speech of five hours' duration. John Adams, who was present, says that on that day "the child Independence was born." The same year Otis was chosen a representative to the colonial assembly, where he opposed paying out money for enterprises not authorized by the assembly; and he further argued this point in 1764 in a pamphlet entitled *The Rights of the Colonies Vindicated,* which had great influence. He assisted in the calling of the Stamp Act Congress in 1765, of which he was a leading member, and he served on the committee which prepared an address to the British Parliament. In 1769 he had a controversy with some British officers who assaulted him so severely that he lost his reason. There were lucid intervals afterwards, however, in one of which he fought at the Battle of Bunker Hill. The speeches and writings of Otis gave great impetus to the independence movement.

Otranto, *O' trahn to,* **Strait of,** a passage connecting the Ionian with the Adriatic Sea. Its narrowest width, 45 m., is opposite Otranto in Italy and Cape Linguetta in Turkey.

Ottawa, *Ot' a wah,* a tribe of North American Indians. They belonged to the Algonquian family and were found by the French in Canada and in the Upper Peninsula of Michigan. They were friendly to the French but fought for the English in the Revolutionary War. Pontiac was their celebrated chief. They live in Ontario, southern Michigan and Oklahoma. See PONTIAC.

Ottawa, the capital of the Dominion of Canada and of Carleton Co., Ontario, is situated at the junction of the Ottawa and Rideau rivers and on the Canadian Pacific, Grand Trunk, Canadian Northern and other railroads, 116 m. w. of Montreal. An electric railway connects it with Hull, Aylmer, Britannia and nearby points, and steamers connect with Montreal, Kingston and other lake and river points through the Rideau Canal and the Ottawa River.

The city stands on a cluster of hills extending from 60 to 155 ft. above the river, and is divided by the Rideau Canal, the western section being known as Upper Town and the eastern as Lower Town. The beautiful scenery surrounding the city is enhanced by the Chaudière Falls at the west end, which are 1000 ft. wide and 40 ft. high, and the Rideau Falls, so called by the early French explorers because of their curtainlike appearance, which carry the waters of the Rideau River into the Ottawa at the northeast end of the city. Ten bridges cross the Rideau River within the city limits and three span the Ottawa, connecting the city with Hull in the Province of Quebec. Among the public parks are Major's Hill, Strathcona and the Parliament Building grounds. Ottawa is the residence of the governor-general of Canada, the seat of the United States consul-general and the see of the Roman Catholic archbishop and that of the Anglican bishop.

The crowning architectural feature of the city is the splendid group of Italian Gothic government buildings on the summit of Parliament Hill, whose limestone

bluffs rise to a perpendicular height of almost 150 ft. above the river. These buildings form a quadrangle with the open side towards the city. They are built of Potsdam sandstone from the neighboring district at a cost of about $4,000,000, and cover four acres of ground. The foundation stone was laid by Edward VII when he visited Canada in 1860 as Prince of Wales. Other buildings include the Basilica, or Roman Catholic Cathedral of Notre Dame, Christ Church Cathedral, the city hall, Rideau Hall, which is the governor's residence, Victoria Memorial Museum, Royal Observatory and Royal Mint, besides numerous churches and charitable and benevolent institutions. The city is the seat of the Ottawa Roman Catholic University, the Ottawa Ladies' College, a collegiate institute and a provincial normal school. The Parliamentary library contains about 400,000 volumes, and the public, or city, library, 50,000 volumes. The Château Laurier and the Grand Trunk Railway Station, two large and handsomely designed buildings in white limestone, were opened in 1912.

It was down the Ottawa River that the Algonquin and Huron Indians conveyed their annual stock of furs. Later the cargoes of peltry were replaced by rafts of square timber brought down by the Ottawa and its tributary rivers to the St. Lawrence to be loaded on seagoing vessels at Quebec. This business began in 1806 and was continued for a century. The forests on the Upper Ottawa supply the mills at Ottawa city and Hull, where power is generated by the Chaudière Falls, and the annual output of lumber is very extensive. This immense water power is also used for factories, flour mills and the manufacture of matches, paper, leather, indurated-fiber ware, furniture, carriages, brick and tile.

The site of Ottawa was visited by Champlain in 1613 but no permanent settlement was made there until almost two centuries later. During that time the Chaudière portage was the main thoroughfare between Montreal and the great Western fur country. The founder of the city was Colonel By, the promoter of the Rideau Canal, and it was named Bytown in his honor, but the old Indian name of Ottawa was restored at the time of incorporation, 1854. Queen Victoria selected it as the capital of Canada in 1858. Population in 1911, 87,062.

Ottawa, Ill., a city and the county seat of La Salle Co., 83 m. s.w. of Chicago, at the confluence of the Fox and Illinois rivers, on the Illinois and Michigan Canal and on the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific railroads. The city is an important manufacturing and commercial center, having an active trade in grain and other products. Among its manufactures are cigars, buggies, wagons, carriages and farming tools, pottery, crockery, glass and silver-plated ware, tile and terra cotta, organs, pianos, collars, harness and fire brick. It is the seat of St. Francis Xavier Academy (Roman Catholic) and of the Pleasant View College (Lutheran). Prominent features of the city are the Ryburn Memorial Hospital, the Illinois Appellate Court Building, the city and county buildings, Odd Fellows' and Reddick's public libraries and four parks. Ottawa was incorporated in 1837. Population in 1920, 10,816.

Ottawa, Kan., a city and the county seat of Franklin Co., 58 m. s.w. of Kansas City, on the Osage River and on the Missouri Pacific, the Atchison, Topeka & Santa Fe and other railroads. Near the city soft coal and natural gas are found, and a substantial trade in grain and live stock is carried on. In and near the city are carriage factories, flour mills, machine shops, a fence factory, a creamery, nurseries, grain elevators, soap works and a foundry. Among the attractions of the city are the Ottawa University, a thriving Baptist institution founded in 1865; a Carnegie library; and a public park, in which there is held an annual Chautauqua Assembly. There are also several conspicuous buildings, including the courthouse, theater and fine churches. Settled in 1854, Ottawa was first chartered as a city in 1866. Population in 1920, 9,018.

Ottawa River, a river of Canada, forming part of the boundary line between Ontario and Quebec. It rises 160 m. n. of Ottawa in the Laurentian divide, which separates the basin of the St. Lawrence from that of Hudson Bay, and flows southwest 625 m., emptying into the St. Lawrence, of which it is the chief tributary. Its tributaries are the Gatineau, Rideau and the Rivière du Lièvre. Several rapids and cataracts, chief among which is the Chaudière Falls, render navigation impracticable above a distance of 250 m. from its mouth, except for the passage of timber from the interior forests to the lumber mills of Hull and Ottawa. The Ottawa was the old portage trail for the fur traders and explorers for a century and a half.

Ot'ter, a sharp little animal of the Weasel Family, inhabiting both land and water and making its living by fishing. Its body is long and sinuous, fitted for rapid turns and dives in the water, where its webbed feet act as paddles and its strong, tapering tail makes an excellent rudder. The small black eyes are set close to the nose in such a position that the otter can easily follow the movement of its prey in the water, whether it is above, below or behind. The ears are small and their openings may be closed at will; the jaws are strong and the teeth sharp. The fur of the otter is valuable, being soft and generally rich brown, black or frosted in color. The North American otter was once found throughout the continent but it is not now common except in the North. Near fishing streams otters are considered pests, since they prove to be much more able fishermen than those who must carry poles and lines. Otters are very playful and in winter carry on the sport of coasting with as much enjoyment as do boys. They spread their short forelegs in front of them and coast down a snow-covered ridge, delighting in a slide which ends in a long skate across an ice-covered pond or a dip in a running stream. In captivity they are equally playful and become tame, but are rough playmates and readily use their sharp teeth.

The sea otter, which furnishes the most costly of furs, inhabits Pacific coasts, especially near Alaska, Kamchatka and California. It is said that their birth always takes place upon floating beds of kelp, and some of the species spend their entire lives there. The mother, who provides for the young until they are nearly full-grown, sleeps upon her back in the water with her young, or "pups," held tightly in her forepaws.

Otter, William Dillon (1843-), a Canadian soldier, born in Ontario and educated at Upper Canada College and at the Royal Military School. Entering the volunteer militia in 1861, he was promoted lieutenant in 1864 and served on the Niagara frontier and throughout the Fenian Raid. His advance in the service was steady, and after he had served with distinction in South Africa, 1899-1900, where he was attached to General Buller's staff in Natal, he was promoted major-general, 1910. The same year he became inspector-general and chief military adviser to the minister of militia.

Ot'to I, surnamed the Great (912-973), the founder of the Holy Roman Empire of the German nation. He was elected King of Germany in 936, and immediately upon assuming control of his kingdom was forced to put down rebellions among the Slavs and Hungarians. Later, in 951, he invaded Italy, the northern part of which he subjugated. In 961 he again entered Italy and the following year received from Pope John XII the imperial crown, thus founding the Holy Roman Empire of the German nation. He early asserted his authority by effecting the deposition of John and causing Leo VIII to be elected pope. Later in his reign Otto made war on the Italian provinces of the Byzantine Empire. See HOLY ROMAN EMPIRE.

Ot'toman Empire. See TURKEY.

Ottum'wa, Iowa, a city and county seat of Wapello Co., 90 m. s.e. of Des Moines, on the Des Moines River, and on the Chicago, Burlington & Quincy, the Wabash, the Chicago, Rock Island & Pacific and the Chicago, Milwaukee & St. Paul railroads. The city is built on

both sides of the river, which furnishes abundant water power. Valuable coal beds are in the immediate vicinity. Ottumwa is the commercial and distributing center of southern Iowa and northern Missouri. With these facilities the manufacturing interests are extensive. The chief products of the industrial establishments are fresh and packed meat, butter, flour, hay tools, agricultural implements, wooden handles, steel gears, office and store furniture, cigars, candy, stoneware, brick, tile, mining tools, mine equipment, steam boilers and engines, structural iron, corrugated culverts and tanks, and feed and foundry products. A large trade in manufactured articles, fruit, coal, poultry, live stock and farm products is carried on.

Ottumwa is built upon a series of natural terraces, which recede from the river, and has a number of prominent buildings, among them the Federal Building, Y. M. C. A. and Y. W. C. A. buildings, Union Railway Station, courthouse, city hospital and public library. Among the educational institutions are St. Joseph's Academy, grammar schools, a high school and parochial schools. The city is the headquarters of the Ottumwa division of the Southern Federal Judicial District Courts of Iowa, and here are held sessions of the United States District and Circuit courts. The place was settled in 1842 and incorporated as a village in 1844; the city has the commission form of government. Population in 1920, U. S. Census, 23,003.

Ot'way, Thomas (1652-1685), an English dramatist, born in Sussex. After studying at Oxford he became an actor; failing in this, he turned to play writing. His two best plays—*The Orphan* and *Venice Preserved*—are representative of the Restoration tragedy. Otway's plays, in spite of artificial plots, have genuine passion, and he excelled in depicting the pathos of affection. See DRAMA.

Ouida, *We' da.* See RAMÉE, *Ra ma'*, LOUISE DE LA.

Ounce, or **Snow Leopard,** a large and beautiful member of the Cat Family, closely related to the leopard and much resembling it. It lives in cold regions of Asia, particularly in the highlands of Tibet and near the snow line of the Himalayas. Its coat is gray and marked with black, irregular, leopardlike spots which render the thick, long hair very beautiful and the pelts very valuable. The tail is long and bushy. The ounce makes its home in rocky dens, whence it comes out to prey upon goats, sheep and other small animals.

Ounce. See WEIGHTS AND MEASURES.

Ouzel, *Oo' z'l,* a bird of the Dipper Family. The water ouzel, or dipper, is about the size of the robin (eight inches). These sprightly little birds, with their slate-gray bodies and brownish-tinged heads and necks, are inhabitants of more or less mountainous regions, in the neighborhood of streams. The nest is oven-shaped, with an opening on one side, and is made of moss. It is always placed near running water and contains three to five white eggs. The ouzels somewhat resemble some of the wrens in their peculiar bobbings. They seem quite at home in the water, even swimming under water for considerable distances.

In England, the name ouzel, or ring ouzel, is applied to a blackbird and to a rail which is called the brook ouzel.

Ov'enbird", a bird of the Warbler Family. The ovenbird is about six inches long, the back is brown, the crown is dull orange and the white breast is spotted with black. Its thrushlike breast has given it the name of golden-crowned thrush. It is one of the commonest of our woodland species during the nesting season, but at other times it is shy and difficult to observe. Its song is very characteristic and has been described as resembling the word *teacher* repeated several times in an ascending key. The nest is an arched or domed structure of leaves and roots, with a lining of fine roots and hair, and a large opening placed at the side. Three to six cream-colored, brown-spotted eggs are laid. The nesting season begins in May and two or three broods are raised. The ovenbird ranges from Alaska south to

northern South America, migrating in winter to southern Florida, Mexico, the West Indies and the United States of Colombia.

Ov'id (43 B. C.-17 A. D.), the name generally applied to the Roman poet, Publius Ovidius Naso. He was born at Sulmo, high among the Apennines in the country of the Pæligni. He was educated for the bar and carefully trained in the art of declamation, but it is doubtful that he ever practiced in his profession. After studying at Athens and making a tour of Asia and Sicily, he withdrew to a gay and licentious private life. In 8 A. D. the Emperor Augustus issued to him an edict of banishment, the cause of which is a mystery, and Ovid was commanded to depart for Tomi, a town on the desolate shores of the Black Sea. There he died, all efforts to shorten his banishment being in vain, and he received final honors from the people of Tomi, among whom he was a favorite. Among his works are love elegies, *Art of Love, Love Remedies* and the beginning of the *Metamorphoses* and the *Fasti*, his two best-known writings. All his verse is varied and vigorous, touched by a lively fancy and executed by a hand trained rather for producing effects of music and color than for sober exactness and self-restraint.

Owen, *O' en,* **Robert** (1771-1858), an English social reformer, born in North Wales. At 18 he was part proprietor of a cotton mill, and when he became head of similar mills at New Lanark, Wales, he there introduced reforms which made him celebrated throughout Europe. Believing in a modified communism, he came to the United States in 1824 and founded a community at New Harmony, Ind., which proved a failure, as did subsequent experiments in Great Britain and Mexico.

Owen Meredith. See LYTTON, EDWARD ROBERT BULWER.

O'wensboro, Ky., a city and the county seat of Daviess Co., 114 m. s.w. of Louisville, on the Ohio River and on the Louisville & Nashville, the Illinois Central and the Louisville, Henderson & St. Louis and other railroads. Additional transportation facilities are provided by river steamboats. The city is situated in a productive agricultural region and one which abounds in mineral wealth. Coal, iron, lead, zinc, building stone, oil and clay are among the natural resources. Within the city are various manufactories and other industrial plants, including auto-truck and cigar factories, a furniture factory, wagon, carriage and automobile works, flour and planing mills, a wheel factory, a cellulose factory and the only stenotype factory in the world. The trade in tobacco is extensive, Owensboro being one of the most important leaf- and strip-tobacco markets in the United States. There is a fine system of public schools. The chief educational institutions are the Owensboro College for Women (nonsectarian), and St. Francis Academy, a Catholic school for boys. The Federal Building and county courthouse are prominent buildings of the city. There are about 39 churches. Hickman Park and a Chautauqua Assembly ground are in the vicinity. The place was permanently settled in 1798 and called Yellow Banks. In 1815 the town was platted and the name changed to Rossborough; two years later it received its present name in honor of Col. Abraham Owen, an Indian fighter. Owensboro was incorporated in 1866. Population in 1920, 17,024.

Owen Sound, a town in Ontario, Canada, the capital of Grey County, situated on the Georgian Bay, 99 m. n.w. of Toronto, and on the Canadian Pacific and Grand Trunk railways. The harbor, with a dry dock 300 ft. long, is one of the best on Lake Huron, and is a terminus for the Canadian Pacific and other steamship lines. The fine public buildings and the extensive manufactures and trade give evidence of the flourishing condition of the town. Mill machinery, agricultural implements, furniture, bricks and sewing machines are manufactured. There are also large grain elevators, flour mills and sawmills. Population, 10,000.

Owl. The Owl Family includes about 200 species of birds of prey. Owls

are characterized by having round, flat faces, with eyes directed forward and surrounded by a ruff of feathers. Several species also have tufts of feathers on the head, resembling ears or horns, and from this peculiarity the long-eared owl and the great horned owl take their name. Most owls fly by night and spend the day in sleep in some secluded and deeply shaded place, such as the top of an evergreen tree in a dense wood. The plumage is abundant and remarkably soft, rendering the owl's flight noiseless.

Owls feed upon mice, squirrels, and other Rodents, upon small birds, and, to a limited extent, upon insects. They destroy many farm pests and should be considered by the farmer as a friend instead of an enemy, as is too often the case. The color is usually some shade of brown, mottled with darker shades of the same color. The snowy owl, an inhabitant of the Arctic regions, is white with brownish markings. In winter this owl is quite common in the northern New England States. Owls build their nests in old trees, and in holes in trees, and the eggs are always white. They vary in number with the species.

The little screech owl, about ten inches long, and the barn owl, a little larger, are the two species best known. The call is a peculiar hoot or whoop. When uttered suddenly in the stillness of the night, it is often startling, and superstitious people regard the owl as a bird of evil omen.

Owos'so, Mich., a city of Shiawassee Co., 28 m. n.e. of Lansing and about 80 m. n.w. of Detroit, on the Shiawassee River and on the Grand Trunk, the Michigan Central, the Ann Arbor and other railroads. It is situated in a district containing deposits of coal, and is engaged in manufacturing. The manufactured products include door and window screens, dining-room tables and other furniture, carriages, spokes, hickory handles, snow shovels, caskets, knit goods, rugs, butter and breakfast foods. There are car and machine shops, meat-packing establishments and a beet-sugar factory. The beet-sugar industry is extensive. Owosso was settled in 1836 and was chartered in 1859. Population in 1920, 12,575.

Oxal'ic Acid, an acid containing carbon, which is found in the oxalis plant, from the juice of which it was first obtained. It is found united with calcium in many other plants and in some animal tissues and organs. It is generally prepared by treating fats or sugars with nitric acid to induce them to take up more oxygen. Oxalic acid is a white crystallizable powder, used frequently as a bleach but not extremely well adapted to that purpose, as, unless it is much diluted, it injures the fabric which is being treated. It is also used in medicine.

Oxenstierna, *Ok' sen stern" a,* or **Oxenstjerna, Axel** (1583-1654), a Swedish statesman, born in Upland. He studied at the University of Wittenberg, devoting much attention to theology. In 1603 he entered the service of Charles IX of Sweden, displaying such marked qualities of statesmanship that he was appointed head of the regency when Charles became incapable of performing his duties. In 1611, on the accession of Gustavus Adolphus, Oxenstierna became chancellor. In this capacity he arranged the Peace of Stolbova with Russia in 1617, and four years later administered affairs at home while the King was carrying on the Polish war. Oxenstierna rendered effective assistance to Gustavus Adolphus in the Thirty Years' War, and managed the Swedish part of the struggle after the King's death at Lützen, besides directing the policy of the Protestants in Germany until the Peace of Westphalia in 1648. In 1645 he represented Sweden at the Peace of Brömsebro with Denmark. Shortly before his death he unsuccessfully opposed the abdication of Queen Christina.

Ox'ford, the principal city and the county seat of Oxfordshire, England. It is located at the confluence of the Thames (Isis) and Cherwell rivers, 52 m. by rail n.w. of London. The city is very old, and has derived its name probably from the popular etymology, used on its coat of arms—Oxenford, or an ox crossing

the river; or connects with Ousenford—a ford crossing the River Ouse. Its chief significance now is due to the fact of its being the seat of Oxford University. These buildings add beauty to the city, despite the surrounding marshes formed by the River Thames. Other buildings of importance are St. Martin Carfax, the old city church, St. Peter's Church, the new municipal buildings and His Majesty's Prison. It was a city of prominence in King Alfred's Day, and with its annexation to the West Saxon Kingdom in 912, it was first mentioned in the *Chronicle*. During the Reformation it was the scene of many struggles, and in the succeeding civil wars it was long a center for the Royalist party. Population in 1911, 53,049. See OXFORD, UNIVERSITY OF.

Oxford Movement, a movement on the part of a few young men of Oxford, who were later joined by numerous followers, to reclaim the Church of England from the lethargy into which it had fallen, and to restore to it the spirituality and symbolism that the Catholic Church of the Middle Ages had possessed. The movement was initially inspired by John Keble, in 1833, when he delivered at Oxford a sermon on national apostasy. In July of the same year a few friends met in Suffolk and there decided to begin the publication of a series of papers called *Tracts for the Times*. These Tracts, appearing from time to time, dealt with the polity, doctrine and worship of the Church. The leaders were soon known as Tractarians. Besides those clergymen already mentioned and among others, Edward B. Pusey and John Henry Newman gave their services to the cause. The Tractarian Movement ended in 1845, when Newman severed his allegiance with the English Church and united with the Roman Catholic. Under new leaders, however, the movement developed along broader lines. The results of the Oxford Movement may be summarized as follows: the restoration of order and dignity to public worship; the elevation of the standard of the clergy; the strengthening of the work among the poor; the giving of a new impetus to educational work; the strengthening of the hold of the Church upon the affections of the people.

Oxford, University of, at Oxford, England (1201). This, the oldest and most famous of English universities, is a federation of colleges, the development of bands of students who first gathered together in houses. The exact date of its founding is unknown, but the first public document in which it appears as a university bears the date of 1201. In 1249 a sum was given for the endowment of chairs and during this century three colleges were founded by separate gifts. Oxford now includes the following colleges for men: University, Balliol, Merton, Exeter, Oriel, Queen's, New, Lincoln, All Souls, Magdalen, Brasenose, Corpus Christi, Christ Church, Trinity, St. John's, Jesus, Wadham, Pembroke, Worcester, Hertford and Keble. Four colleges for women, Somerville, Lady Margaret Hall, St. Hugh's Hall, and St. Hilda's Hall, are maintained, but these do not grant degrees. Instruction at Oxford is given by lectures and private tutors, the recitation system common to American institutions not being employed. The curriculum includes nearly all branches of knowledge. All degrees of collegiate rank are conferred, the granting of degrees being based upon university examinations. Perfect freedom is allowed each student in the choice of subjects. A board of control manages affairs pertaining to the interests of the university as a whole, while each college is also supervised by an individual board. Oxford has an especial interest for Americans because of the gift of Cecil Rhodes, by which the university has become the Mecca of numerous scholarship students from the United States. See RHODES SCHOLARSHIPS.

Oxygen, a colorless gas discovered by Priestley in 1774, but given its present name by Lavoisier, who investigated its properties a little later. It is the most plentiful element on the earth, being a constituent of air, water and rock, and in combination with other elements being

found in all animals and plants. Oxygen is tasteless and odorless, about 1.1 times as heavy as air, and may be condensed into a light blue liquid if subjected to high pressure at a temperature of —119°. This liquid is strongly attracted by the magnet and has been frozen into a pale blue, snowlike solid.

Oxygen unites with almost all known elements, and the compounds formed by these unions are called oxides. The change that takes place is called oxidation and is illustrated by the rusting of iron, which is caused by the union of the metal with the oxygen of the air. Oxidation is ordinarily accompanied by the liberation of heat, but in the case of the rusting iron the process goes on so slowly that the heat set free is not usually perceived. If the process is more rapid the heat is liberated faster, as in the burning, or oxidation, of wood. Rapid oxidation is generally spoken of as combustion and ordinarily takes place only at increased temperatures (See COMBUSTION).

Oxidation is also a function of respiration, for the oxygen of the inhaled air passes through the lining of the lungs and is there taken up by the blood corpuscles, forming a bright red compound which gives the color to the blood in the arteries. In these corpuscles the oxygen is carried to all parts of the body, where it burns up the worn-out tissue (See RESPIRATION).

While oxygen is necessary to all but the most minute forms of animal life, it is too active to be breathed alone for a great length of time. In the air it is diluted by nitrogen, but when not so diluted it acts upon the tissues of the body too vigorously, and an animal confined in an atmosphere of oxygen could survive but a short time. Undiluted oxygen is sometimes prescribed by physicians to patients who have difficulty in breathing, but it must be administered with great care. Oxygen is also a necessary factor in decay but here acts only in the presence of certain bacteria.

Oxygen is produced by many methods, chief among which are: the heating of red mercuric oxide, interesting historically since it was in this way that oxygen was discovered; the heating of potassium chlorate, usually mixed with manganese dioxide; the evaporation of liquid air; the separation of water into the two gases, hydrogen and oxygen, by electricity; and the method called *Brin's Process*, which is used commercially and owes its usefulness to the peculiar attribute of barium oxide, which if heated to 500° takes up oxygen, forming barium oxide; this upon further heating, preferably under reduced pressure, gives off oxygen and returns to barium oxide, after which the process may be repeated indefinitely. Oxygen can now be purchased in strong steel cylinders in which it has been stored under great pressure.

Oxygen is set free in nature by green plants, which in sunlight take up carbon dioxide and water to form starch and oxygen; the latter is given off to the air.

OZONE. This is a modified form of oxygen, having a strong odor and great activity in combining with other elements; it is produced when an electric spark is passed through air or oxygen and it may be detected by its odor about electrical machines in operation, on electric cars, or in the freshness of the air after an electric storm. Since three volumes of air yield two of ozone, it is supposed that ozone has three atoms to a molecule, while oxygen has but two. Ozone is similar to oxygen, but more active. When breathed in quantity, it attacks the membranes of the nose and throat, causing severe headaches.

Recently very satisfactory results have followed the use of ozone as a deodorizer and a disinfectant. The ozone is blown into the apartment, or the air is passed through tanks of ozone, and the air is thus rendered sweet and fresh. This ozonizing process has been successfully used in theaters and factories where the air quickly becomes contaminated. Ozone is used commercially with oxygen and in the place of pure oxygen. Given to athletes it is said to revive their energy, but has the same after effects as any stimulating drug. See ALLOPTROPY.

Oyama, *O' ya ma,* Iwao, PRINCE (1842-1916), a Japanese military officer. In 1894 he was appointed commander of the second Japanese army; and as commander-in-chief of the Japanese troops during the Russo-Japanese War, he captured Port Arthur and the fortress of Wei-hai-wei. He was rewarded for these victories by the rank of marquis, and three years later he was created field marshal. He also received the title of Prince in 1907; the year before, the British Order of Merit had been conferred upon him.

Oys'ter, a family of bivalve Mollusks of great commercial importance. Members of the family differ greatly in size, but the structure is practically the same in all. They have soft bodies, which are attached to the shell by a stout muscle, known as the adductor, able to keep the two halves of the shell tightly closed. A fold of muscle, called the mantle, grows from each side of the body and completely lines the shell. The space between these folds constitutes the body cavity. Two huge folds of muscle conceal the mouth, and other flaps form the gill chambers. The hard, muscular portion is the foot, which the oyster can extrude, although the adult does not use it as a means of locomotion.

Oysters reproduce by eggs, and the young are free-swimming for a time; later they attach themselves to a rock or other submerged object, where they sometimes collect in such numbers that their growing shells become ill-shaped and crowded. When allowed to grow naturally, the shells are oval, somewhat enlarged at one end. Pearls are produced by the introduction of hard particles, around which the oyster secretes a constantly hardening substance (See PEARL).

Oyster fisheries are of importance chiefly as a food supply. Great natural beds, whose supply once seemed unlimited, were located in Long Island Sound, Chesapeake Bay, the coasts of the Carolinas and the Gulf of Mexico. Because of the lack of regulation in oyster fisheries, these beds began to show signs of failing until the matter was taken up by the United States Fish Commission, and through its influence, oyster farming and oyster culture are becoming well-regulated industries. In some places beds are given up entirely to the production of seed oysters; these are the young, free-swimming oysters, which have not yet found a permanent resting place. In this form they are sent to the oyster farms, which are marked off by buoys in such a manner that each farmer may know his own territory. To be successful, this marine farm must have a sandy bottom, so that the young oysters will not be smothered in the mud. Cultches, or objects to which the oysters may attach, such as clean shells and tiles, are deposited before the seed is planted. By careful dredging to keep the oysters from crowding, intelligent seeding and protection against oyster enemies, chiefly starfish, an oyster fisherman may build up a profitable industry whose product is never a drug on the market.

Oysters are sold in the shell, in bulk, and canned. Under modern conditions they are taken up by steam or hand dredges and are canned immediately. Under ordinary conditions oysters are practically free from infection, but typhoid germs are sometimes introduced when the oysters are placed in fresh water for the purpose of swelling them. The products of the oyster beds of the United States constitute about 30 per cent of the total value of the American fisheries, and from this viewpoint they are the most important branch of the industry. An interesting discussion of the oyster fisheries is found in James L. Kellogg's book entitled *Shell-Fish Industries.* See FISHERIES; STARFISH.

Oyster Bay, N. Y., a town and popular resort of Nassau Co., 23 m. n.e. of New York City, on the northern coast of Long Island on a bay opening into Long Island Sound and on a branch of the Long Island Railroad. A line of steamboats also connects Oyster Bay with New York. The town has attractions of fine scenery, and facilities for bathing, boating and fishing. Oyster cultivation is

the principal industry. Within the limits of Oyster Bay are the villages of Glen Cove, Sea Cliff and Hicksville. Oyster Bay was the home of Ex-President Roosevelt. Population in 1920, 20,296.

Oyster Catcher, a bird of the Snipe and Plover Family. These birds are about 18 inches long; the upper parts are brownish-black, the under parts white, the head and neck glossy black and the wings have a white spot. The bill is rather long, flattened and chisel-shaped; the bill and eyes are red; the feet and legs are flesh color. These birds present an awkward appearance but can run swiftly; they are frequently seen walking along beaches in search of oysters and other Mollusks. The nest is a hollow scooped out in the sand of the shore, and in it the two spotted eggs are laid. The oyster catcher ranges from Virginia south to Brazil and Chile.

Oyster Plant. See SAL'SIFY.

O'zark Mountains, a range of low dome-shaped mountains extending across the southern part of Missouri and the northern part of Arkansas into Oklahoma. The general trend is from northeast to southwest. They range in altitude from 1500 to 2000 ft. Some of the peaks in Missouri contain extensive deposits of iron ore, and in Arkansas the slopes are heavily timbered. The Ouachita Mountains south of the Arkansas River are a part of the Ozark system.

O'zone. See OXYGEN.

P

PACIFIC, *Pa sif' ik,* **OCEAN,** the expanse of water which lies between North and South America on the east and Asia and Australia on the west. The ocean was named by Magellan. It is the largest expanse of water on the globe, being larger than the combined areas of the four continents which form its boundaries, and occupying one-half of the water surface of the earth. It connects with several other bodies of water—the Atlantic at Cape Horn, the Arctic at Bering Strait, the Sea of Japan, the China Sea, the Yellow Sea and the Sea of Okhotsk; on the south it is continuous with the Antarctic Ocean. The ocean's floor is very irregular. It slopes gradually from the shores of Asia, but on the eastern side descends abruptly to a great depth. In its deepest parts soundings of 31,614 ft. have been made; the mean depth is 13,800 ft. The largest plateau of the Pacific lies southeast of New Guinea and includes the Solomon, Fiji, Tonga and Ellice islands. The depth between these islands is from 1000 to 2000 fathoms. From other plateaus rise the Caroline Islands, the Low Archipelago, Hawaii and the Marshall and Gilbert groups.

The drainage into the Pacific is much less than that into the Atlantic, and the currents are less marked than those of the latter. In general, the direction of the currents follows that of the prevailing winds (See TRADE WINDS). The surface movement of the Northern Pacific constitutes a great eddy revolving in a north-east-south-west direction (See KURO SIWO); while in the Southern Pacific the current describes a circle in the opposite direction, though the movement is less well defined, owing to absence of land boundaries. The Pacific tides never attain the maximum heights reached in the Atlantic or even in the Indian Ocean; and the trade winds are more irregular than those of the Atlantic. Terrible hurricanes, called typhoons, frequently occur in the Chinese seas, and are likely to rage at any season of the year (See TYPHOON). The first European to reach the Pacific, according to recorded history, was Balboa, who, in 1513, sighted its waters from a peak on the Isthmus of Darien.

Paddy Bird. See JAVA SPARROW.

Paderewski, *Pa" de ref' skee,* **Ignace Jan** (1860-), a distinguished citizen of Poland, born in the province of Podolia, in the Ukraine. When a mere child he showed remarkable fondness for music and began giving recitals when only eight years of age. At 18 he was a professor in the Warsaw Conservatory, where he had previously studied. In 1884 he went to the conservatory at Strassburg, and in 1887 made his formal début in Vienna. He at once was placed in the first rank among the great pianists, and until 1905, when his health failed, he appeared repeatedly in the large cities of Europe and America. The World War brought him into prominence as a statesman. He first devoted his energies to raising funds for the relief of his countrymen. When New Poland was organized, the provisional government was confronted with extremely difficult problems. Paderewski was made premier and foreign minister and became one of the leading statesmen of the reconstruction period of Europe.

Pad'ua, a city of Italy, capital of the Province of Padua, is situated on the Bacchiglione River, 22 m. s.w. of Venice, with which it is connected by rail. The city has a triangular form and is surrounded by walls and ditches. The chief object of interest is the Piazza Vittorio Emanuele, an extensive promenade beautified with numerous statues, and the Cathedral, which dates from 1500. The

buildings of the university, the municipal art gallery and many private residences are also of interest. The industries include the manufacture of cloth and a few other commodities and are not important. The university, which dates from the 13th century, was formerly one of the largest and most distinguished in Europe. Its attendance is now about 1500, and the library has about 140,000 volumes. Ancient Padua was the most important town of Venetia. In 1405 it became a port of Italy. Population, about 105,135.

Paducah, *Pa du' kah,* **Ky.,** a city and county seat of McCracken Co., about 50 m. n.e. of Cairo, Ill., at the confluence of the Ohio and Tennessee rivers, 37 m. from the Mississippi River, and on the Illinois Central, the Nashville, Chattanooga & St. Louis and other railroads. The new railway bridge across the Ohio gives direct rail connection through Paducah with the South, and with the Gulf and Atlantic coast terminals leading to the Panama Canal. Paducah has one of the best deep-water harbors of any inland city in the country and has access to over 4000 m. of navigable rivers. Over 800,000 tons of freight are handled annually by the river interests. The wholesale business here surpasses that of any other city in the state except Louisville, and Paducah is the largest retail market of west Kentucky. The government has begun improvements in and around the city which will involve the expenditure of $20,000,000. The municipality maintains public parks, and there are hospitals and a fine United States Government Building. Paducah is built on a high elevation, and no levees are needed for the protection of the city against floods. It is situated in a rich agricultural region and within 25 to 40 m. of the great deposits of coal, iron ore, fluor spar, zinc, lead and pottery clays. The lumber and tobacco interests are extensive, and there is an important wholesale trade in live stock, groceries, vegetables, grain and hardware. Equally important are the manufactures, which include furniture and other lumber products, steamboats, cotton rope, flour, brick and foundry and machine-shop products.

Paducah, said to have been named in honor of an Indian chief, was laid out in 1827 and incorporated a year later. A city charter was granted in 1856. In 1861 it was fortified by General Grant, and, three years later, while occupied by a garrison of 800 Federals under Hicks, it was unsuccessfully attacked by a force of 5000 Confederates under Forrest. Population in 1920, U. S. Census, 24,735.

Paganini, *Pah" gah ne' ne,* **Nicolò** (1782-1840), an Italian virtuoso, born at Genoa. His first lessons were given by his father, and he received additional instruction with the chapelmaster of the Cathedral of San Lorenzo. After making a successful public appearance in Genoa at the age of nine, he journeyed to Parma for the purpose of studying with Alessandro Rolla; but that teacher declared that the pupil had gone as far as the master. Paganini returned to Genoa and practiced prodigiously, attaining a marvelous technique. He played in London, and made many tours of Europe, acquiring a fortune, much of which, however, he afterwards lost in speculation. In 1827 the Pope decorated him with the Order of the Golden Spur. Everywhere his playing brought tremendous crowds, drawn as much by the fantastic personality of the man and by the curious tales circulated about him as by his unparalleled skill. He was the first to develop a bewilderingly intricate technique of the violin and as such he was epoch-making. Many of his compositions were of such difficulty that only he could execute them. There have been greater artists than Paganini, but few if any have equaled his dexterous performances.

Page, *Paje,* **David Perkins** (1810-1848), an American educator, born at Epping, N. H. He spent two years at Hampton Academy preparing for teaching; taught in the country schools of New Hampshire, and as associate principal of the Newburyport High School; and in 1845 was chosen principal of the Albany (N. Y.) State Normal School,

the first institution of its kind west of New England. He brought this school to a high standard; but exhausted himself in securing success, and died suddenly after a service of only four years. He was noted for his lectures on teaching. Page's *Theory and Practice of Teaching* was the first work of its kind prepared in this country, and is still extensively used.

Page, Thomas Nelson (1853-), an American novelist, born in Virginia. He was educated at Washington and Lee University and at the law school of the University of Virginia. The publication of his short story, *Marse Chan,* in 1884, was the beginning of his literary career. His stories present a faithful and interesting picture of Southern life, and are widely popular. *In Ole Virginia* is a collection of stories in negro dialect. Other writings are *Two Little Confederates, Polly, Social Life in Old Virginia, Red Rock, Gordon Keith* and *John Marvel, Assistant. The New South* is a volume of essays. In 1913 he was appointed United States ambassador to Italy.

Page, William (1811-1885), an American portrait painter, born in Albany, N. Y. He studied at the National Academy of Design, and in Europe, where he lived from 1849 to 1860. From 1871-1873 he was president of the National Academy of Design. Among his chief works are *Farragut at the Battle of Mobile,* the property of the Czar of Russia; *The Holy Family,* in the Boston Athenæum; and *The Young Merchants,* in the Pennsylvania Academy of the Fine Arts.

Pago'da, a tower of many stories and ordinarily having the stories separated by projecting, verandalike roofs. Pagodas are common in India, China, Farther India and Japan, where they are either single structures or are parts of temples or memorials. The finest pagodas are the pyramidlike stone towers of India; those of China are often merely of rough brick.

Pain. See TOUCH.

Paine, *Pane,* **Robert Treat** (1731-1814), an American lawyer, a signer of the Declaration of Independence, born in Boston, Mass. He graduated from Harvard, taught school, visited Europe and studied theology and law, practicing his profession of law for many years. He was prosecuting attorney in the case of Captain Preston after the Boston Massacre. Having been delegated to the provincial and Continental congresses, he was attorney-general of Massachusetts and associate justice of that state's Supreme Court after the Revolution.

Paine, Thomas (1737-1809), a political and philosophical writer, born in Thetford, England. He was the son of a Quaker, and his schooling ended at the age of 13, when he entered his father's shop and learned the trade of a stay-maker. Later he went to London, where he was for some time connected with the excise service. On the suggestion of Benjamin Franklin, who had seen some of Paine's essays, he came to the United States in 1774, and within a year he became editor of the *Pennsylvania Magazine.* He championed the cause of the colonists, which he set forth in a pamphlet entitled *Common Sense.* This pamphlet was probably Paine's greatest work, and it brought him into prominence at home and abroad. So great was its influence that the Pennsylvania Legislature voted him £500, and the Pennsylvania University conferred upon him the degree of M. A. Later the pamphlet was translated into several European languages. His *Crisis* was issued at irregular intervals during the Revolutionary War and exerted great influence in favor of the American cause. Paine served for a short time on the staff of Gen. Nathanael Greene, then became clerk of the Pennsylvania Legislature. In 1781 he was associated with Colonel Laurens in obtaining loans from France and Holland. His services during the war were highly appreciated, and after peace was declared Congress voted him $3000, and the State of New York gave him a large farm in Westchester County.

Paine again went to Europe, reaching France during the Revolution. Here he published a pamphlet under an assumed

name, advocating the abolition of royalty. While in England he published the *Rights of Man,* for which he was outlawed. He fled to France, where he was welcomed as a hero and elected to the National Convention. He soon incurred the displeasure of Robespierre and was thrown into prison, where he spent nearly a year. It was while in prison that he wrote most of his *Age of Reason,* in which he attacked the religious beliefs and systems of his day, and thus brought upon him the censure of Churchmen in Europe and America. This work also alienated some of his friends. Six years later he returned to the United States.

Paine was one of the most widely known men of his day. He was brilliant but erratic, and his irregularities occasionally brought distress upon him and embittered his spirit. He has often been considered an atheist, but he was not, though he did not accept the tenets of the Church. Notwithstanding his faults, the magnitude of his services to the United States can scarcely be estimated.

Paint, a substance used for coating materials for the purpose of preserving them from the weather, or for decoration. Paints contain a coloring matter called the pigment and a liquid called the vehicle. To these a solvent is sometimes added for the purpose of thinning the paint, and a drier to make the coating harden more quickly. White lead or zinc white, or both, mixed with boiled linseed oil, form the basis of oil paints. To this base any coloring matter desired may be added. Paints for the outside of buildings and other structures exposed to the weather should contain a large proportion of white lead, for otherwise they are not durable. Water-color paints are those in which the vehicle is water, and when used for decorating walls they are usually sized with glue. Most oil paints now in use are prepared in large manufactories and put up ready for use in tin cans, kegs and barrels. Water colors are usually sold in the dry state in packages, and are prepared for use by adding the necessary quantity of water. See PIGMENTS.

Paint'ing, in ordinary usage, a work of fine art in color. The process involves drawing and the laying of color upon a surface to which it is made to adhere by mixing it with some liquid or semiliquid medium. The various mediums employed have given name to the different kinds of painting. *Pastel* is a variety of painting in dry chalk, but this is usually designated as pastel rather than painting. *Fresco* is wall decoration done on wet plaster, the colors being mixed with water and powdered lime; the color sinks into the damp stucco or plaster and becomes a part of it, so that the painting lasts as long as the material containing it. Most of the wall painting of ancient Egypt and down to the 16th century was executed upon this foundation. The work not done in fresco but upon wood or stone was generally protected by some such glaze as varnish, which penetrated the pigment and so preserved it. In *encaustic painting,* employed in medieval times, the color was burnt into the ground surface by means of hot wax. In *tempera,* or *distemper,* used extensively in the later Middle Ages and still employed in scene painting or wall decoration, the pigments are mixed, or tempered, with an emulsion of egg yolk, white of egg or liquid glue, and vinegar. In the 15th century *oil painting* was introduced, and canvas became the surface material, used almost to the exclusion of every other. *Water color painting* refers to any process in which the colors are mixed with water and some adhesive material, as gum, instead of oil; but, at present, the term refers especially to painting done with such materials upon a paper which shows through as a ground work.

The art of painting is one of the most difficult for the layman to appreciate. The painter must draw objects, not as they are, but so as to present an illusion that they exist, and must employ color and light, not as they appear in nature, but in such a way that they will *seem* like nature. This rendering of an appearance of reality is, however, only a small part of the work. The noblest

works of art are those in which reality is reinforced by rhythm of line, purity of color and balance of parts, in which the complete work constitutes, as in poetry or other work of art, a harmonious whole —interesting in content and in ingenuity of execution. It is for the content of a picture, the thing represented, that the person uneducated in art is apt to care most. If a picture depicts with realism a familiar historical incident, he will admire the picture because the story is told in an intelligible manner. In this kind of a picture such representation is important; but it is not the end of art. The aim of painting is to utilize any object or combination of lines and colors in the production of a pattern which appeals to the eye. The objects employed to this end may be heroes or despicable cowards, saints or sinners; if they can be used to fill a given space agreeably and form the basis of beautiful masses of color and of light and dark they are fit subjects for the artist. Most paintings contain both the descriptive and pictorial elements, but one or the other usually predominates; thus it follows that all painting is divided into two distinct groups—that which is illustration and that which is decoration. In illustration, the emphasis is directed toward telling a story; in decoration, the primary purpose is to treat a surface in such a way that it will delight the eye.

History of Painting

Early Period. *Egypt.* Here the first painting was on the walls of sepulchres and commemorated the deeds of the deceased; the figure on the mummy case was supposed to bear a likeness to the body it contained and was, therefore, a form of crude portraiture. At a later period this symbolic illustration also appeared on the walls of public buildings, and stories of the lives of the kings and the pursuits of the people were set forth. More often the scenes were mythological. The figures were often first indicated in raised or low relief, and then the color was laid on in flat tones without shade or gradation. Ideas were conveyed largely through symbol; a single tree indicated a forest; and a few stalks of grain, an entire field; the human figure was always drawn with the body facing the spectator, while the face and legs were in profile; the eye was shown on the side of the face, but drawn as it naturally appears in full view. These same peculiarities appeared for thousands of years, and artists seem not to have made the slightest effort to give a more realistic imitation of nature; if the thing was sufficiently lifelike to be recognized, it was adequate.

Babylonia and Assyria. The painting that remains from these countries closely resembles that of Egypt, although it shows a marked advance in representation of form. Great skill was shown in drawing, and the subjects were mythological and historic. Animals were especially well drawn.

Greece. Painting in Greece never reached the high point of perfection enjoyed by the sister arts of sculpture and architecture; its highest development came in the fifth and fourth centuries B. C. Few of the works of these early artists remain, and the most are known through contemporaneous writers. Parrhasius, Zeuxis, Polygnotus and Apelles are among those whose names have come down to us. Like sculpture, painting was in the service of the State and was employed in the decoration of public buildings. Nearly all statuary was painted, and on marble buildings, such as the Parthenon, sculpture and other architectural details were colored.

Rome. Roman painting was in many respects a reflection of that of Greece, but it developed an individuality, as is seen in the scant remains of fresco decorations in Etruria and Pompeii; these are Greek in form and subject, but Western in spirit.

Medieval Period. Painting, like sculpture, in the medieval period was an adjunct of architecture, and its purpose was to supply both decoration and illustration. With the decline of the empire and the rise of Christianity, it became devoted to the service of the Church, and under this domination it remained for more

than ten centuries, there accomplishing its most brilliant achievements. At first its purpose was purely utilitarian—to teach the Bible to those who could not read. Church interiors were covered with Scriptural scenes, executed in a manner which well illustrates the Christian reaction against the Greek view of life with its love of beauty. Early Christian art is stiff and lifeless, and the figures are little more than symbols. This was superseded by the more ornate Byzantine art, which sprang from a mixture of Oriental and decadent Greek art; it originated in Byzantium (Constantinople) when that city became the seat of the Roman Empire and when Christianity was made the state religion. Byzantine art was also formless and stiff, but it was more elegant, decorative and rich in color than its predecessor. It influenced European art widely from the fifth to the fifteenth century, and still prevails in Greece, Turkey and parts of Russia. Its chief remains are floor and wall mosaics and illuminated manuscripts.

Italy. About the middle of the 13th century a number of painters working in different parts of Italy, stimulated by the awakening naturalism of Gothic sculpture, began to make more lifelike figures. The first of these painters to put movement into figures and life into faces was Cimabue. A study of European art from this time shows a gradual but steady growth from the first childlike efforts of these early artists through a multitude of workers, each adding his individual knowledge and observation of nature. Numerous styles, or "schools," arose which were either an imitation of the work of some one artist or the manifestation of local tendencies. The two leading schools of the 14th century were the Florentine and the Sienese; the former aimed to secure accurate representation of form; the latter, to express sentiment and emotion. The first great painter of the Florentine School was Giotto di Bondone. He had hundreds of imitators, but for fully a century no advance was made upon his work as a whole. See CIMABUE, GIOVANNI; GIOTTO DI BONDONE.

The Sienese School was founded by Duccio, the first medieval painter to arrange figures in realistic groups expressive of a dramatic situation. Its chief exponents were Simone Martini, who improved the figure and facial expression, and the brothers Lorenzetti.

EARLY RENAISSANCE. *Italy.* In the 15th century painting declined at Siena, but advanced in Florence, while important schools arose at Umbria, Venice and other cities of northern Italy. Florentine painting was carried on by Masaccio, who advanced the study of perspective; Fra Filippo Lippi, the first to individualize faces in sacred pictures; Botticelli, remarkable for linear grace and decorative charm; Verrocchio, known as a sculptor, and the teacher of Leonardo da Vinci.

The Umbrian School advanced a more highly emotional type of art; it is chiefly represented by Signorelli, who made striking use of the human figure and was, in this respect, the forerunner of Michelangelo; and Perugino, the teacher of Raphael. Painting at Padua culminated in Mantegna, a master of a dignified vigorous style which powerfully influenced the art of Venice. The Venetian School, distinguished by harmonious use of color, was founded in the latter half of the 15th century by the Bellini family. Giovanni Bellini was the first exceptionally noteworthy painter of that city. Schools also arose in Lombardy, Bologna and Ferrara, but produced few men of pronounced genius. See MASACCIO; LIPPI, FRA FILIPPO; BOTTICELLI, SANDRO; VERROCCHIO, ANDREA DEL; SIGNORELLI, LUCA; PERUGINO, PIETRO; MANTEGNA, ANDREA; BELLINI, JACOPO; BELLINI, GIOVANNI.

Netherlands. In the latter part of the 14th century several schools of painting arose north of the Alps. A high development was reached in Flanders in the work of the brothers, Hubert and Jan van Eyck, who first made use of the background as an aid to the sentiment of the picture. Another great master was Hans Memling. See EYCK, VAN, HUBERT AND JAN; MEMLING, HANS.

HIGH RENAISSANCE. *Italy.* The highest development of Italian painting was reached in the first half of the 16th century and chiefly through the Florentine and the Venetian schools. The former had continued steadily to advance and was distinguished from the first for its perfection of form. The two great Florentine masters of this time were Leonardo da Vinci, the foremost scientist of his time and an artist whose paintings show perfection of form, with the added charm of spiritual significance; and Michelangelo, great as a painter and sculptor, a good draughtsman and a creative genius. Raphael, the leading painter of the Roman School, produced works that combined all the best elements of the art of his time. The greatest master of northern Italy outside of Venice was Correggio, the chief exponent of the nature worship of the Renaissance. The Venetian School, famous for its colorists, produced Giorgione, whose work subordinates detail to beauty of line and color; Titian, the greatest colorist that ever lived; and Tintoretto, who sought to combine the color of Titian with the vehemence of Michelangelo. After these masters came many mediocre imitators and a period of decline ensued. Later a reaction against this imitative tendency was started at Bologna by a family of artists named Caracci. See VINCI, LEONARDO DA; MICHELANGELO BUONARROTI; RAPHAEL SANZIO; CORREGGIO; GIORGIONE DA CASTELFRANCO; TITIAN; TINTORETTO, IL; CARACCI.

GERMANY, HOLLAND AND FLANDERS. Meanwhile the Renaissance began to flower in the North. The first great German master was Albrecht Dürer of Nuremberg, the most original and imaginative genius of his country. Foremost, however, is Hans Holbein, the younger, remarkable for his realism. Flemish painting in this century is represented by Quintin Matsys, who drew life-size figures; and the Dutch by Lucas van Leyden. See DÜRER, ALBRECHT; HOLBEIN, HANS.

THE 17TH AND 18TH CENTURIES. Although some of the world's masters of painting belong to the 16th century, the two following centuries were remarkable for the large number of artists and the masterpieces produced. The leading school of this period was the Dutch, and the first of the painters in point of time was Frans Hals, an unrivaled portraitist. His contemporary, Rembrandt, was the greatest painter Holland ever had, a wonderful master of light and shade. The Dutch excelled as painters of scenes of everyday life, and they treated still-life delightfully. Ruysdael and Hobbema were among the leading landscapists, but so numerous and so gifted are the painters of this school that it is not possible even to enumerate them. The Flemish School, led by Rubens, was influenced by Italian art and showed great beauty of line and color. Rubens excelled in depicting richly-colored pageants of life; his pupil Van Dyck was a remarkable portrait painter. Among the Flemish painters of the 17th century was Teniers, who painted delightful scenes of everyday life. In Spain the influence of the Italian naturalists was conspicuous in Velásquez, by far the chief artist that Spain has produced and one of the few great geniuses of all time, and again in the work of Murillo, which is unsurpassed in its expression of religious ecstasy.

In France the "heroic landscape" found its chief exponents in Poussin and Claude Lorrain, both of whom did most of their work in Italy. Madame Lebrun was the chief figure painter of the period. The great triad of English artists of the 18th century were: Hogarth, a remarkable satirist; Reynolds, who established academic methods in England; and Gainsborough, a great portraitist and figure painter. See HALS, FRANS; REMBRANDT; RUYSDAEL, JACOB; HOBBEMA, MEINDERT; RUBENS, PETER PAUL; VAN DYCK, SIR ANTHONY; TENIERS, DAVID; VELÁSQUEZ, DIEGO RODRIGUEZ; MURILLO, BARTOLOMÉ ESTEBAN; POUSSIN, NICOLAS; CLAUDE LORRAIN; LEBRUN, MARIE LOUISE; HOGARTH, WILLIAM; REYNOLDS, SIR JOSHUA; GAINSBOROUGH, SIR THOMAS.

THE 19TH CENTURY. France was the chief source of art inspiration of the 19th century. The first of the important movements originating there was the classical revival, instituted by David. A revolt against the classical tendency occurred about 1830, contemporaneously with the reaction against Classicism in literature; it is known as the Romantic movement, and was led in painting by Delacroix. The Barbizon School represented that branch of Romanticists that found expression in the poetic treatment of landscape. Leaders of this school were Corot, Rousseau, Daubigny, Cazin and Millet. After this sprang the great school of Impressionists, organized in 1874 and led by Claude Monet. This school exercised and continues to exercise a very great influence upon painting in England, Germany and the United States. Its aim is to fix upon canvas a fleeting impression of a momentary aspect of nature, to render effects of light and to catch and convey the impression of life and movement. The work of the Impressionists was done chiefly out of doors. See DAVID, JACQUES LOUIS; DELACROIX, FERDINAND VICTOR EUGÈNE; COROT, JEAN BAPTISTE CAMILLE; DAUBIGNY, CHARLES FRANÇOIS; MILLET, JEAN FRANÇOIS; MONET, CLAUDE.

In Germany the revolt against Classicism was inaugurated in 1815 under the leadership of Overbeck. Associated with him in the movement were Cornelius, Kaulbach, Schadow and Lessing. The return to realism came in 1870, and among the leaders was Menzel, a great historical painter. Great Britain did not come under French influence until very recently. In the beginning of the century there appeared the historical painters Etty, Haydon and Eastlake; the mystical genius, William Blake; painters of everyday life, as Wilkie, Mulready and Frith; and Constable and Turner, painters of landscapes. See CORNELIUS, PETER VON; KAULBACH, WILHELM VON; BLAKE, WILLIAM; TURNER, JOSEPH; CONSTABLE, JOHN.

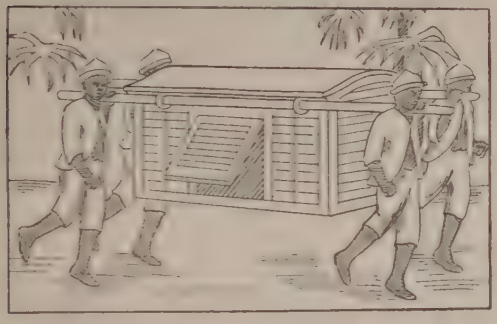
About the middle of the century, a small brotherhood of artists, displeased with the cut and dried academic tendencies of art, inaugurated a movement which should derive its inspiration from painters before the time of Raphael. This school is known as the Pre-Raphaelites, and among its leaders were Rossetti, Holman Hunt, Burne-Jones, Millais and Brown. Other prominent artists of this period were Leighton, Walter Crane and Herkomer. In other parts of Europe no influential schools have been established. Munkácsy in Hungary, Fortuny, Sorollo and Zuloaga in Spain, and Vereshtchagin in Russia are the prominent names.

The United States, in the early part of the 19th century, claimed such artists as Copley, West, Trumbull, Stuart and Vanderlyn, though many of these were British. In the second period appeared Durand and Church and their contemporaries, Henry Inman, William Page, Daniel Huntington, W. M. Hunt and Thomas Hicks, who were strongly influenced by the French. Among the foremost painters at the beginning of the 20th century were John La Farge, Elihu Vedder, Edwin Blashfield, W. M. Chase, and Winslow Homer. Among the great landscapists are Inness and Homer Martin. Some of the greatest Americans have done their work abroad; such are James McNeill Whistler, E. A. Abbey and J. S. Sargent. The foregoing are only a few of the leading names in the history of American painting, which at present is represented by a large school individual in its tendencies and in its choice of subjects. See ROSSETTI, DANTE GABRIEL; HUNT, WILLIAM HOLMAN; BURNE-JONES, SIR EDWARD; MILLAIS, SIR JOHN EVERETT; LEIGHTON, SIR FREDERICK; CRANE, WALTER; HERKOMER, SIR HUBERT VON; COPLEY, JOHN SINGLETON; WEST, BENJAMIN; TRUMBULL, JOHN; PAGE, WILLIAM; VEDDER, ELIHU; BLASHFIELD, EDWIN HOWLAND; CHASE, WILLIAM MERRITT; LA FARGE, JOHN; HOMER, WINSLOW; INNESS, GEORGE; MARTIN, HOMER DODGE; ABBEY, EDWIN AUSTIN; WHISTLER, JAMES ABBOTT MCNEILL; SARGENT, JOHN SINGER.

Paintings, The Twelve Great. According to competent art critics the

twelve greatest paintings in the world are as follows: *Last Supper,* Da Vinci, 1498, Santa Maria delle Grazie, Milan; *Assumption of the Virgin,* Titian, 1518, Venetian Academy; *Immaculate Conception,* Murillo, 1678, Louvre; *Beatrice Cenci,* Guido Reni, 1509, Barberini Palace; *The Night,* Correggio, 1522, Dresden Gallery; *Aurora,* Guido Reni, 1609, Rospigliosi Palace, Rome; *Descent from the Cross,* Volterra, about 1545, Church of S. S. Trinita de' Monti, Rome; *Descent from the Cross,* Rubens, 1612, Antwerp Cathedral; *Communion of St. Jerome,* Domenichino, 1614, Vatican; *Last Judgment,* Michelangelo, 1534-1541, Sistine Chapel; *Sistine Madonna,* Raphael, 1518, Dresden Gallery; *Transfiguration,* Raphael, 1519, Vatican.

Pakenham, *Pak' en am,* **Sir Edward Michael** (1778-1815), a British soldier, born in Ireland. He was brother-in-law to the Duke of Wellington, under whom



PALANQUIN

he won great fame for gallantry and ability as a leader in the Peninsular War. During the War of 1812, then a major-general, he commanded the British fleet of 50 vessels which bore 20,000 veterans and 1000 heavy guns to the Gulf of Mexico, with New Orleans as an object. The fleet arrived at the entrance to Lake Borgne on Dec. 10, 1814. On Jan. 8, 1815, a battle was fought at New Orleans, where Pakenham was killed, two horses being shot beneath him. See NEW ORLEANS, BATTLE OF.

Palanquin, *Pal" 'an kwin',* or **Pal"an-keen',** a conveyance in the form of a covered box, provided with latticed shutters and fastened to two long poles, by which it is borne on the shoulders of men. It was formerly much used in India, China and other Eastern countries as a means of travel, but since the introduction of railways and the improvements in roads, other methods of transportation have been found more desirable.

Palate, *Pal' at,* a name applied to the roof of the mouth. It consists of two parts, the hard and the soft palate. The hard palate is situated well to the front and rests upon the bone separating the mouth and the nasal cavities. It serves as a support for the tongue in eating and speaking. Behind it and continuous with it is the soft palate, which is composed of muscles and membranes and ends in a movable arch over the back of the mouth in front of the throat. Along the edge of the arch and parallel with it are two folds of membrane, called pillars. In the middle of its arch the palate makes a dip in the shape of an imperfect V, about a half inch in length, forming the uvula. This can easily be seen by means of a mirror. Its special use is not definitely known. It is subject to enlargement and irritation and is often a cause of coughs. On each side between the pillars or arches is a long, narrow, troughlike depression. These hollows are called fauces. The tonsils are two glandular bodies, each about the size of an almond, which are situated at the lower ends of the fauces just above the pharynx. The soft palate contains numerous glands which secrete the mucus which lubricates the throat during the passage of food. Besides playing an important part in the swallowing process, it aids in the production of certain sounds. See PHARYNX; TONGUE.

Palat'inate, the name of two small countries in the old German Empire. These were known as the Upper Palatinate and the Lower, or Rhenish, Palatinate. The former is now included within the Bavarian district of the Upper Palatinate and Regensburg, with Amberg the capital. The latter was composed of an irregular strip of territory lying on

both sides of the Rhine, and in 1214 it was acquired by the House of Wittelsbach in the person of Louis I, Duke of Bavaria. Early in the 14th century a part of Bavaria between the Danube and the Fichtelgebirge was given by the Emperor Louis to his kinsmen ruling in the Rhenish Palatinate, and thus originated the Upper Palatinate.

In 1356 Emperor Charles IV designated the Count Palatine of the Rhine as one of the seven imperial electors. Rupert III occupied the throne of Germany from 1400 to 1410. During the Reformation the electors favored the Protestant cause. While the Thirty Years' War was in progress the Elector Frederick V was defeated at White Hill and deprived of his lands, and the electoral dignity was conferred on Maximilian I, Duke of Bavaria, who in 1628 was formally invested with the Upper Palatinate. By the Treaty of Westphalia (1648) the son of Frederick V regained the Lower Palatinate, while the Upper Palatinate remained a part of Bavaria. During the Napoleonic wars that part of the Palatinate on the left side of the River Rhine was ceded to France, while the territories on the right bank were divided among Baden, Hesse-Darmstadt, Leiningen and Nassau. At the Congress of Vienna, France was deprived of that part beyond the Rhine, which was divided among Bavaria, Hesse-Darmstadt and Prussia.

The Rhenish Palatinate and the Upper Palatinate have an area respectively of 2289 and 3729 sq. m. Population of the former in 1910, 937,085; of the latter, 600,284.

Paleontology, *Pal" e on tol' o jy,* a science which treats of extinct forms of organic life. It includes the study of both plant and animal life, based upon fossil remains found embedded in the rocks. It has close affiliations with botany, anatomy and geology. A comparative study of the various fossil remains in connection with the rocks with which they are associated has led to a fairly accurate knowledge of the order of succession of the chief type forms, and has made possible a division of geologic time into periods and systems. Not all species of plant and animal life are represented in fossil deposits; but in spite of the numerous gaps, the wealth of detail furnished by these records constitutes a remarkable history, showing lines of descent of many races of animals and plants. See FOSSILS.

Paler'mo, a seaport of Sicily, capital of a province of the same name, situated on the northwest side of the island, on the Bay of Palermo. The prominent buildings are the royal palace, the university, a cathedral of the 12th century, the archbishop's palace, the custom-house and several medieval houses and towers. The new harbor has large docks and shipbuilding yards. The manufactures are chiefly glass, gloves and leather. The surrounding plains yield oranges and lemons, which constitute the principal exports. The fisheries of the island are significant. The city was probably founded by the Phœnicians. It became the capital of the Carthaginian dominions in Sicily, was captured by the Greeks, the Romans and the Normans, and the final deliverance from foreign rule was brought about by Garibaldi in 1860. Population 345,891.

Pal'estine, or **The Holy Land,** a small state in southwestern Asia, bordering the Mediterranean sea, extending from Halfa south to the Gulf of Akkaba and from the valley of the Jordan west. Its area is about 20,000 sq. m. Its existence as an independent state, under the protection of Great Britain, was one of the results of the collapse of Turkey in the World War. It is the modern form of the Jewish state as it existed before the division of Solomon's kingdom. An important physical feature is a low plain, bordering the coast and extending inland from 5 to 20 miles, where it merges into a highland region that gradually rises to an altitude of 1500 ft. Beyond this is a narrow plateau from 3000 to 5000 ft. in altitude and upon which the chief mountains are located. This plateau is divided by the great Plain of Esdraelon,

which extends to the Valley of the Jordan. In the section south of this plain are Gilboa, Gilead, Gerizim, Ebal and other mountain peaks, all widely known for their connection with Old and New Testament history. Rising from the plain itself is Mt. Tabor, supposed to be the scene of the Transfiguration, and on the point facing the south shore of the Bay of Acre is Mt. Carmel, where Elijah routed the prophets of Baal. The plateau north of the plain contains ranges of low hills and their mountain ranges, which are southern extensions of the Mountains of Lebanon.

The most striking physical feature of Palestine is the Valley of the Jordan, whose bed for nearly its entire length is below sea level. Rising north of Palestine, the Jordan flows through Lake Huleh (Merom) and the Sea of Galilee on its way to the Dead Sea, into which it empties. Owing to its windings, the entire length of the stream is about 200 m., though in a direct line the distance from its source to its mouth is less than 70 m. The valley has steep slopes on both sides, and the valley forms a serious obstruction to travel east and west. Beyond the Jordan Valley the country is a plateau, with an altitude of about 1500 ft.

Palestine has a mild climate, though the summer months may be oppressive, owing to the high degree of humidity of the atmosphere. The year is divided into two seasons: summer, extending from April to November; and winter, from November to April. The summer is the dry season. During the winter there is a considerable fall of rain, though the yearly average is only about 20 inches. Snow falls occasionally, but the ground seldom freezes.

Forests of oak and pine still exist, but, in general, the country is barren and desolate. In some places the olive, the walnut, the sycamore, the palm and oleander are found, and figs, olives, oranges and some cereals are raised. The soil is fertile, and with irrigation and proper cultivation will produce abundant crops.

Palestine is of world-wide interest only because of its connection with Biblical history. It was first known as the Land of Canaan, and previous to its occupation by the Israelites it was held by a number of independent tribes, of which the Philistines, who dwelt along the coast, were the farthest advanced in civilization and the most powerful. At the Israelitish invasion most of these tribes were conquered, though the Philistines were never permanently subdued. For more than 1000 years the country was the home of the Hebrew people. About 1050 B. C. the tribes were united under Saul, who was the first civil king of the Hebrew nation. Under David, Saul's successor, the surrounding country was conquered and the kingdom became firmly established, and during the reign of Solomon its fame spread to all surrounding nations. At Solomon's death the kingdom was divided, Israel occupying the northern portion and Judah the southern portion of the country. In 722 B. C. the Kingdom of Israel was overthrown by the Assyrians, and in 586 B. C. Judah was overthrown by the Baylonians. During the time of Christ, Palestine was held by the Romans, who divided it into four provinces, Galilee, Samaria, Judea and Peræa. In the seventh century it passed to the control of the Mohammedans with whom it remained except for a brief period during the Crusades, until the overthrow of Turkey in 1918. Its establishment as a free state was due to the recognition of the feeling throughout Christendom of the propriety of such a step.

It sets aside, under a government of its own, the land of Sacred Story whose valleys and plains, its oriental hamlets and its chief city are associated with so much that appeals to the religious faith of mankind.

Palestine, Tex., a city and the county seat of Anderson Co., 150 m. n. of Houston, on the International & Great Northern, the Dallas, Corsicana, Palestine & Gulf and other railroads. The manufacturing establishments include cotton-gin works, cottonseed-oil mills, feed mills, grain elevators, brickworks and manufactories of crates and baskets,

office fixtures, show cases and cigars. The salt plant has an output of about 150 cars per month. The general shops of the International & Great Northern Railroad are located here, with a pay roll of $1,000,000 per year. The noteworthy buildings include wholesale houses, banks, churches, schools, and a Y. M. C. A. Building costing $60,000. A new courthouse to cost $150,000 is under negotiation. Anderson County took first prize in the state contest for the greatest yield of corn per acre in 1911, and first and second prize for greatest yield in 1912 without fertilization or irrigation. Palestine was settled in 1846 and incorporated under the general law of 1870. Population in 1920, U. S. Census, 11,039.

Palisades, *Pal" i sadz',* a perpendicular cliff of basaltic rock, on the west bank of the Hudson River and extending northward for about 15 m. from Fort Lee, N. J. The cliff is from 350 ft. to 500 ft. in height, and in places the rocks have been broken into fantastic forms. Throughout their entire length the Palisades present a picturesque appearance, and they are considered one of the most remarkable cliffs in the world. They add much to the scenic beauty of the Hudson. See HUDSON RIVER.

Palladio, *Pahl lah' dyo,* **Andrea** (1518-1580), one of the greatest classical architects of the 16th century, born at Vicenza, Italy. After study of ancient monuments at Rome, he returned to his birthplace and became famous as a designer of many noble edifices, in which he manifested knowledge, skill and taste in adapting the style of Roman architecture to the needs of his time. His buildings are characterized by dignity and breadth of treatment and beauty of design. They include an arcade around the Basilica of Vicenza, the Barbarano and Chierigiti palaces, and his masterpiece, the Marcantonio Tiene Palace; the Rotonda Capra Villa and the Church of Il Redentore.

Palla'dium, a famous statue of Minerva, believed to have fallen from heaven into Troy, whose safety depended upon the possession of this talisman. During the Trojan War, Ulysses and Diomedes, disguised, carried the Palladium off to the camp of the Greeks. The Romans long claimed that this statue was preserved in their temple to Vesta. They were supposed to have received it from Æneas, who had received it from Diomedes.

Palm, *Pahm,* a name applied to a number of useful plants grouped together in the Palm Family. They are chiefly tropical plants, and, though mainly trees, are in some cases shrubby or even grasslike. The palm trees have slender, cylindrical stems, crowned by a graceful tuft of long, featherlike leaves; lower palms, such as those often seen in greenhouses, have leaves whose divisions spread like fingers from the palm, whence the family derives its name. The flowers are often inconspicuous, but the fruits are generally large and of commercial importance. The palm is one of the most useful plants, especially in its native regions, where it furnishes food, clothing, furniture, tools, dishes and other domestic necessities, as well as the material for the house itself. The tree palms are best known in the United States through their products. See COIR; COCONUT; DATE; DOUM PALM; IVORY PALM; PALMETTO.

Palma, *Pahl' mah,* **Jacopo** (about 1480-1528), a Venetian painter of the High Renaissance. He was called Palma Vecchio (Old Palma), to distinguish him from his grandnephew. He was a pupil of Giovanni Bellini and shows the influence of his master in his *Tobias and the Angel* (Stuttgart). Later he was influenced by Giorgione and Titian. Palma is one of the leading painters who take rank just below the great masters, such as Titian, Giorgione, Raphael, etc. As a colorist he was little beneath Titian, but he lacked the power and vigor in draughtsmanship which is a part of genius. In his best period Palma painted an altarpiece of St. Barbara in the Church of Santa Maria Formosa, Venice. The figure of the Saint is one of the most beautiful and majestic female figures in Venetian art. Other important works

are *The Adoration of the Shepherds* (Louvre), *The Madonna and Child Adored by Saints* and *Meeting of Jacob and Rachel.*

Palma, Tomas Estrada (about 1836-1908), a Cuban general and patriot, first president of Cuba, born in Cuba and educated at the University of Seville. He was active in the Cuban insurrection of 1868 and became president of the new republic, but was captured and carried to Spain. Subsequently he founded, and managed until 1895, a school in Orange County, New York. In 1895 he became plenipotentiary of the Cuban Republic, of which in 1901 and in 1906, he was elected president. Charges of fraud, however, brought on an insurrection. Palma resigned, and order was restored by intervention of the United States. See CUBA, THE REPUBLIC OF, subhead *History.*

Palmer, *Pahm' er,* **Alice Freeman** (1855-1902), an American educator, born at Colesville, N. Y. She graduated at the University of Michigan, taught at Lake Geneva, Wis., and was professor of history in Wellesley College for two years, becoming acting president of this institution in 1880, and two years later its president. In 1887 she resigned, and married George H. Palmer, a professor at Harvard. Later, she served for three years as nonresident dean of women of the University of Chicago, and was for a time a member of the Massachusetts State Board of Education. She frequently lectured upon educational and municipal problems. Mrs. Palmer received honorary degrees from several universities.

Palmer, John McAuley (1817-1900), an American statesman and soldier, born in Scott County, Ky. Admitted to the Illinois bar in 1839, he had been a Democratic senator and a Republican member of the electoral college by the outbreak of the Civil War, during which he served at New Madrid, Island No. 10, Murfreesboro, Chickamauga, Chattanooga and in the Atlanta campaign, and was promoted major-general of volunteers. He was a Republican governor of Illinois, 1869 to 1873, and a Democratic United States senator, 1891 to 1897. In 1896 he was presidential candidate of the Gold Democrats. He is the author of *Personal Recollections.*

Palmer, Mass., a town of Hampden Co., on the Chicopee River, 15 m. n.e. of Springfield, and on the Boston & Albany division of the New York Central and Central Vermont railroads. The manufactures include carriages, straw goods, cotton and woolen goods, carpets and other articles. A good high school is maintained. The town includes the villages of Bondsville, Thorndike and Three Rivers. Population in 1920, 9,896.

Palmer, Ray (1808-1887), an American clergyman and hymn writer, born in Rhode Island and educated at Yale. He was early a teacher, in 1835 was called to the pastorate of Central Congregational Church, Bath, Me., and in 1850 transferred to First Congregational Church, Albany, N. Y. In 1866 he gave up pastoral work to become secretary of the American Congregational Union, New York. Palmer is remembered chiefly as a hymn writer, his *My Faith Looks up to Thee* existing in 20 different languages. His writings include *Hymns and Sacred Pieces, Hymns of My Holy Hours* and *Voices of Hope and Gladness.*

Palmetto, *Pal met' o,* an unbranched tree of the Palm Family, found in tropical and subtropical countries. The trunks are stout and cylindrical and covered by a reddish bark; the leaves are divided into narrow, spreading divisions, resembling the palm of the hand in form. The flowers are inconspicuous and the fruit is a small black berry, with sweet, fleshy pulp. The palmetto is abundant throughout the West Indies, the Gulf States, Venezuela and Mexico. The trunks are valuable for dock piles, and cross sections are polished and used for making small stands; the branches produce canes; the fibers are used for making scrubbing brushes, hats, matting and baskets. The palmetto is also called the cabbage palm. It is the state emblem of South Carolina.

Palm'istry, or **Chiromancy,** *Ki' ro man" sy,* the art by which it is claimed the palm indicates the character and temperament of a person. Some profess to discover in the palm evidences by which they can describe past events as well as make predictions for the future. The theory is based upon the formation of the lines in the palm, as well as in the shape of the hand.

A prominent line in the palm is the line of life, a curve from the basal joint of the forefinger round the thumb as far as the wrist. When this is deeply colored and continuous, it is said to indicate a long and happy life. Good luck and fortune are shown by a clear and unbroken line from the forefinger to the little finger, called the line of fortune, while the line of health runs across the hand. The fleshy projection at the base of the forefinger is called the mount of Venus; at the base of the thumb, the mount of Jupiter; of the middle finger, the mount of Saturn; of the ring finger, the mount of the sun; and of the little finger, the mount of Mercury; and so on. When Jupiter is well developed, ambition and pride are indicated; Venus, melody and love; Saturn, fatality; the sun, riches; and Mercury, science and wit. Palmistry is not considered to be an exact science.

Palm Oil, a fatty material obtained from several species of palm, but chiefly from the fruit of the oil palm, which is native to the west coast of Africa. The oil is obtained from the fleshy covering of the fruit, and is a deep orange color when fresh, with an odor similar to that of violets. It is used by the natives as food, but is generally employed in making soap and candles and for lubricating machinery. See SOAP; CANDLE.

Palm Sunday, the last Sunday in Lent, so named because palm, boxwood or olive branches are blessed by the priests on that day and carried in procession. This ceremony honors Christ's triumphal entry into Jerusalem five days previous to the crucifixion.

Pa'lo Al'to, Battle of, the first important battle of the Mexican War, fought eight miles northeast of Brownsville, Tex., May 8, 1846, between 2300 Americans, under General Taylor, and 6000 Mexicans, under generals Arista and Ampudia. As Taylor was marching from Point Isabel to Ft. Brown, he met the enemy, and after a five hours' fight, mainly with the artillery, the Mexicans retreated to Resaca de la Palma. See MEXICAN WAR.

Pal"pita'tion, a term applied to abnormally forceful beatings of the heart. It may arise from sudden emotion, disturbance in a vital organ, or may be due to some organic disease of the heart. It is sometimes continuous, but more often comes on at irregular intervals after physical exertion or nervous excitement. Excessive coffee or tea drinking, tobacco or other stimulants may be an accessory cause or may aggravate the disturbance.

Pamir, *Pah meer',* **Plateau of.** See HINDU KUSH MOUNTAINS.

Pamlico, *Pam' li ko,* **Sound,** a sea lagoon on the southeastern coast of North Carolina, stretching 80 m. southward from Roanoke Island. Its average width is 20 m. Long and narrow sand bars separate it from the Atlantic Ocean, and marshes line its inner shores. The fisheries are extensive and large numbers of wild fowl haunt its waters.

Pampas, *Pam' paz,* a term used to designate some of the treeless plains of South America. It applies specifically to the vast tract in the region south of the forested areas of the Amazon basin, particularly that part which lies within the boundary of the Argentine Republic. The pampas embrace an area approximately 250,000 sq. m. The surface is slightly undulating and ranges in height above the sea level from 1300 ft. in the western portion to 100 ft. along the Atlantic coast. During the wet season the plains are covered with grasses and afford pasturage for sheep and cattle. A part of the region is suitable for agriculture.

Pan, Grecian god of shepherds and flocks, of woods and fields. The worship of Pan was introduced into Athens after the Battle of Marathon, and a sanctuary

in a cave on the northwest side of the Acropolis was given him. Various legends sprang up about him. One story is that he pursued the nymph Syrinx to the bank of a river. As he threw his arms about her he found he was embracing only a tuft of reeds. Breathing a sigh, he heard the air sound through the reeds, which produced a plaintive melody. The god then took some of the reeds and made an instrument which he called Syrinx. Pan frequently is represented as having a goat's legs and horns, a shaggy beard and hair and goatlike features. He is also depicted as a youthful shepherd with short horns.

Panama, *Pan" a mah',* **Canal,** a ship canal crossing the Isthmus of Panama from Colon on the coast of the Caribbean Sea to Panama on the Pacific. The length of the canal from deep water in the Caribbean to deep water in the Pacific is about 50 m. The distance from deep water in the Caribbean to Limon Bay is about 4½ m. and from deep water in the Pacific to the shore line is about 4 m.; therefore the length of the canal proper, or the channel in which excavations have been made, is approximately 41½ m. The width ranges from 300 to 1000 ft. on the surface and has a minimum width of 300 ft. at the bottom. The minimum depth is 41 ft.

If passing through the canal from the Atlantic to the Pacific, a vessel will enter the channel at Limon Bay at sea level and proceed for about 7 m. to the Gatun Locks. This channel is 500 ft. wide at the bottom. At the Gatun Locks the vessel is raised 85 ft. to the level of Gatun Lake. It will sail at full ocean speed through this lake in a channel varying from 1000 ft. to 500 ft. in width and 24 m. in length. At Bas Obispo it will enter the Culebra Cut, which extends to Pedro Miguel, a distance of 9 m. The channel through the cut is 300 ft. wide at the bottom. At the Pedro Miguel Lock the vessel will be lowered 30⅓ ft., where it will proceed to Miraflores, a distance of 1½ m. Through the Miraflores Locks it will be lowered 54⅔ ft. to the sea-level section extending to the Pacific. The time for passage will be from 10 to 12 hours.

Preparatory Movements. The events directly related to the construction of the Panama Canal by the United States began in 1878, when Lieutenant Wyse of the French navy, acting for a French corporation, obtained from Colombia a concession for constructing a canal across the Isthmus of Panama. The next year the Panama Canal Company was organized, with Ferdinand de Lesseps, the builder of the Suez Canal, as president. This company proposed to construct a sea-level canal, having a depth of 29½ ft. and a width at the bottom of 72 ft. De Lesseps estimated the cost at $127,000,000 and the time required for completing the work at eight years. The location was the same as that of the present canal. Work was begun in 1881 and continued to 1887. During this time over $200,000,000 had been expended and only a small part of the work completed. Illegal methods were used for securing additional funds, and in 1889 the company was declared bankrupt and dissolved, and a liquidator was appointed to take charge of its affairs. The liquidator finally succeeded in 1894 in forming a new company with a capital of about $13,000,000, distributed over 650,000 shares of stock of 100 francs each; 50,000 shares were subscribed by the Government of Colombia. The concessions and assets of the old company were taken over by the new Panama Company. A commission consisting of engineers from Great Britain, France and the United States was appointed to examine the route selected and the work already done. This commission reported in favor of completing the canal, stating that two-fifths of the work was already done and that the expense of completing the canal should not exceed $102,500,000, and that the time required should not exceed ten years. Work was resumed on a small scale and continued until 1893, when operations were suspended because of lack of funds.

Meantime the United States Government had become actively interested in

PANAMA CANAL

the project, and in 1899 Congress appointed an Isthmian Canal Commission. After a thorough examination of all practicable routes, the Commission reported at the close of 1900 favoring a canal through Nicaragua. Chiefly because of the concessions on Panama held by the French Company, this report finally led to the sale by the French Company of all its property and concessions in Panama to the United States for $40,000,000, Colombia agreeing to the transfer.

The United States immediately began negotiations with Colombia, and in January, 1903, a treaty providing for the cession to the United States of a Canal Zone in Panama was ratified by the United States Senate. However, in July the Colombian Senate refused to ratify the treaty. Following this failure the State of Panama seceded from Colombia and formed an independent government (See PANAMA, REPUBLIC OF). The new state was immediately recognized by the United States, and a treaty was negotiated, by which Panama ceded to the United States a Canal Zone 10 m. wide and extending from the Atlantic coast to the Pacific. The United States paid Panama $10,000,000 and agreed to pay annually the sum of $250,000, beginning nine years after the ratification. This treaty gave the United States the right to construct and control the canal.

CONSTRUCTION. Previous to the ratification of the treaty with Colombia, a canal commission of seven members had been appointed, and some work was done in 1904 and 1905, but work was not actively begun until 1906. Previous to this, a board of consulting engineers appointed by President Roosevelt reported on the type of a canal best suited to the location and the demands that would be made upon it. The board failed to agree and majority and minority reports were submitted to Congress. The first advocated a sea-level canal, and the second, a lock canal. This second report was finally adopted by Congress, and the construction of a canal, with the dimensions given at the beginning of this article, was authorized. In 1905 the commission was reorganized, and authority was concentrated in three members, who were to reside in the Canal Zone. In 1907 the work was placed in charge of the engineer corps of the regular army and under the immediate direction of Lieut.-Col. George W. Goethals as chief engineer.

The four great problems which confronted the commission at the outset were sanitation of the Canal Zone, control of the Chagres River, the construction of the locks and the Culebra Cut.

Sanitation. The construction of the canal required constant employment of an army of 40,000 men, only a few of whom were residents of Panama. The greatest drawbacks that the French encountered, obstacles greater than any problems in engineering, were yellow fever and malaria. The United States Government realized that before successful work could be done the causes of these diseases must be removed. These causes were mosquitoes and impure water. Immediate steps were taken to place the two cities, Colon and Panama, in a sanitary condition. Both cities were provided with a supply of good water, and the disease-bearing mosquitoes were rapidly exterminated. So vigorously was the work of sanitation prosecuted that within two years the Canal Zone was transformed from one of the most pestilential regions to a region of normal healthfulness.

Chagres River. For more than one-half its distance the canal passes through the Chagres River Valley. It was necessary to secure control of this stream, because it is subject to sudden overflows, due to tropical rains. The difficulty has been overcome by constructing a dam at Gatun and impounding the waters of the river, forming a lake 164 sq. m. in area. This dam is over a mile long, and when completed its top was 105 ft. above sea level. It is provided with a spillway, which will keep the surface of the lake at 85 ft. above sea level.

Locks. There are 12 locks in the canal, all in duplicates. There are three

MAN'S GREATEST ENGINEERING ACHIEVEMENT

FIRST WATER ENTERING UPPER MIRAFLORES LOCK

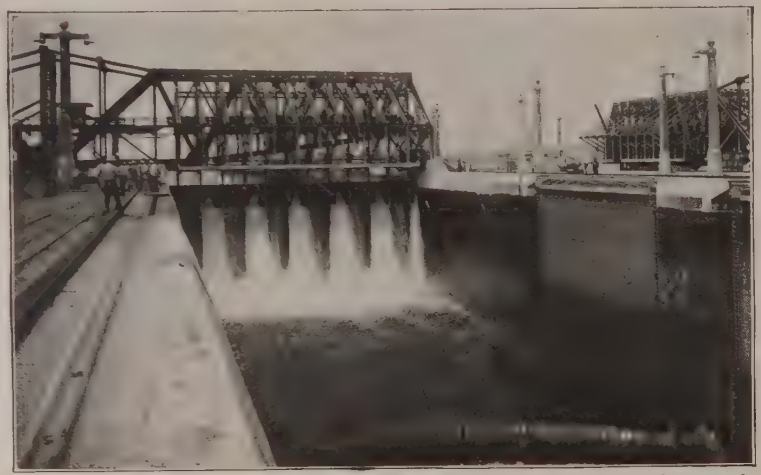
The lock is 1000 feet long, 110 feet wide, 27⅓ feet deep.

THE FIRST BOAT THROUGH THE PANAMA CANAL

HOW THE PANAMA CANAL ZONE LOOKS FROM AN AEROPLANE

The gate at the first Gatun Lock swings open and the ship from the Atlantic enters. (See Bird's-Eye View on opposite page.)

The gate is closed by electric power, water pours into the first chamber and the ship rises with the water level.



We pause at Gatun to inspect an emergency dam to be used if an accident befalls the gates.

Culebra Cut is reached after the ship has steamed at full speed through Gatun Lake.

At Pedro Miguel Lock the ship takes a downward "step" toward the Pacific level.

Miraflores Locks are next reached. This picture shows how the ships are towed by electric engines.

The water in the first Miraflores Lock is lowered, the gates swing open and the ship passes on to the last "step."

When the gates in the distance open, the water will seek the Pacific level and the ship can pass on to the great ocean.

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pairs in the flight of Gatun, one pair at Pedro Miguel and two pairs at Miraflores. The combined height of the locks at Gatun is 85 ft.; of that at Pedro Miguel is 30⅓ ft.; and of those at Miraflores, 54⅔ ft. All locks are of the same size, 1000 ft. long and 110 ft. wide. The walls and floors are of concrete, and each chamber has water-tight gates at the ends. The gates are of steel 7 ft. thick, 65 ft. long and from 47 to 82 ft. high. They weigh from 300 to 600 tons each. The main culverts through which the locks are filled and emptied are 18 ft. in diameter. Lateral culverts extend from these to the chambers.

Culebra Cut. The Culebra Cut, where the canal crosses the watershed to the Isthmus of Panama, was the most stupendous piece of work connected with the project. At its deepest point the cut is 494 ft. deep and at the top it is about half a mile wide. Owing to slides the amount of excavation was greatly increased. A working force of about 8000 was constantly employed on the cut, and when the work was at its height it required 160 trains of 24 cars each to haul away the material each day. The rock, which is soft, was blasted by dynamite and then loaded on cars by steam shovels having capacities of from three to five cubic yards. The trains were unloaded by plows, and it required only six minutes to unload a train carrying 600 tons of material.

Statistical Comparison. The Panama Canal is the greatest engineering enterprise in the world. The following comparisons, which were taken from the *Scientific American,* give some idea of the magnitude of the work. The total excavations of the completed canal amount to 212,227,000 cubic yards. This is enough material to make 63 pyramids, each as large as the Great Pyramid of Egypt. If placed side by side, these pyramids would extend over a distance of 9 m., or the material would fill a canal 55 ft. wide and 10 ft. deep across the United States. The concrete used in the locks and dams would make a pyramid 960 ft. square at the base and 400 ft. high. A train of cars long enough to hold the excavated material would extend around the earth four times.

Commercial Importance. By use of the canal the water route between New York and San Francisco is shortened 7873 nautical miles, and that between New Orleans and San Francisco 8868 nautical miles. The distances between the Atlantic ports of the United States and the Pacific ports of South America is shortened from 4291 to 7245 nautical miles. The distances from New York to Australian and New Zealand ports are also greatly shortened. Distances between the Atlantic and Gulf seaboard of the United States and ports in China and Japan are about the same via the Panama and Suez canals; therefore these waterways are competitors for this trade.

Electrification. The locks are operated by electricity, and ships are hauled through them by electric locomotives which move on tracks beside the canal. The power at the Gatun Locks is furnished at the spillway, and that at Miraflores in a similar manner. Over 1000 motors are required to operate the canal.

Fortifications. The entrances to the canal are guarded by the strongest fortifications in the world. At the Atlantic entrance they consist of two 14-inch and two 6-inch guns, and eight mortars of the most approved pattern. On Manzanilla Point, Colon, they consist of two 6-inch guns; and on Margarita Island, of two 14-inch and two 6-inch guns.

At the Pacific entrance the fortifications are located on three small islands and consist of one 16-inch gun, two 14-inch guns, two 6-inch guns and 12 mortars. The locks and machinery are guarded by a mobile inland force of about 7000 men.

Control. With the completion of the canal the old commission was retired. On Apr. 1, 1914, the new system of government of the Canal Zone was inaugurated, with the following departments: operation and maintenance, purchasing, supply, accounting, health and the executive secretaryship. President Wilson ap-

pointed Col. George W. Goethals the first governor.

OPENING. The canal was opened informally on Aug. 15, 1914, with the passage of the government vessel *Ancon* from the Atlantic to the Pacific.

Panama, Republic of, a republic of South America, formerly a department of Colombia, from which it seceded in 1903. The republic occupies practically all the isthmus joining North and South America, is 350 m. long, from 40 m. to 120 m. wide and has an area of 31,600 sq. m., about the same as that of South Carolina. The country is mountainous, has a tropical climate and is subject to heavy rainfall. The mountain slopes are covered with forests and other tropical vegetation. Along the coasts are rich grazing lands. There are only two cities of importance, Colon, or Aspinwall, on the Caribbean coast; and Panama on the Pacific coast. The people are mostly of Spanish, Indian and negro origin, and there are but few whites. The population is estimated at 419,029.

HISTORY. The Isthmus of Panama has been an important strategic point ever since the settlement of the New World. In 1846 the United States ratified a treaty with New Granada (now Colombia) by which this country guaranteed the neutrality of the isthmus and free transit over the Panama Railroad. After the ratification of the treaty the United States was obliged to interfere several times to keep the railway open. With the commencement of the Panama Canal, this little strip of country assumed a world-wide importance, and this importance led to the formation of the republic.

In 1903, John Hay, secretary of state for the United States, and Dr. Herran, minister of Colombia, negotiated a treaty providing for the construction of the Panama Canal by the United States, and when in July the Colombian Government refused to ratify this treaty, Panama withdrew from Colombia and formed an independent republic, which was at once recognized by the United States. See PANAMA CANAL.

Pan-American Congress, an international conference of representatives from the United States and from 17 states of Central and South America which assembled at Washington, Oct. 2, 1889, on the invitation of the United States. Its purpose was to discuss the formation of an American Customs Union, under which the trade of American nations with one another might be maintained. San Domingo was the only state not represented at the Congress, which was presided over by James G. Blaine, the secretary of state, through whose efforts the work was chiefly planned. The Congress continued for five months without final adjournment.

THE CONGRESS OF 1901-1902. The second Pan-American Congress convened in the City of Mexico, Oct. 22, 1901, the Government of Mexico calling the Congress at the suggestion of President McKinley. Plans for the construction of a railroad to connect North and South America were discussed, as well as arbitration, and the matter of the establishment of a standard silver coin, which shall be legal tender in all the countries represented, received attention.

THE CONGRESS OF 1906. The third Congress was held at Rio de Janeiro, Brazil, in July and August, 1906. The principal topics considered were commercial relations, codification of laws and the "Drago Doctrine," named from Dr. Drago, the Argentine minister of foreign affairs. This doctrine declared that debts owing by South American nations to the nations of Europe cannot be collected by forcible intervention.

THE CONGRESS OF 1910. Buenos Aires, South America, was the place of meeting of the fourth Congress, beginning in July of that year. At this conference a resolution was offered recommending that all American states bind themselves to submit to arbitration all claims for damage which cannot be settled through ordinary diplomacy, and renamed the Bureau of American Republics, established as a result of the Congress of 1889, the Bureau of Pan-American Union. See PAN-AMERICAN UNION, BUREAU OF.

Pan-American Union, Bureau of, a bureau organized as a result of the Pan-American Congress in 1889. When first organized it was known as the Bureau of American Republics, but was renamed by the Congress of 1910. It is under the control of the state department and comprises a committee of which the secretary of state is the chairman, having one representative for each country belonging to the union. The bureau issues a monthly bulletin and an annual report, which are regarded as standards of authority for the dissemination of information, between the countries associated, concerning the commercial conditions, systems of weights and measures and patent, trade-mark and copyright laws. Another purpose is to secure the adoption of a common legal-tender silver coin of all countries and to perfect a plan for the arbitration of disputes. See PAN-AMERICAN CONGRESS.

Pancreas, *Pan' kre as,* a long, narrow, flat gland in the human body, situated behind the stomach and lying transversely. In the adult it is from six to eight inches in length, about an inch and a half wide and one inch thick. Its average weight is about three ounces. It is traversed from end to end by a duct, which carries its secretion, the pancreatic juice, into the small intestine. The pancreatic juice is a colorless, watery-looking liquid, and has the remarkable property of acting upon all food elements, converting starch into sugar, proteids into peptones and fat into emulsion.

Pando'ra (all-gifted), according to Greek myths, the first woman of earth. At the command of Jupiter, Vulcan fashioned her, the gods each endowed her with a charm, the Seasons and Graces robed her. Thus, lovely, Mercury brought her to Prometheus. Her presence was intended as a punishment for his having stolen divine fire for man. Prometheus would not receive her. His brother, however, Epimetheus, welcomed her to his home, in which stood a jar that he had been cautioned never to open. Pandora, impelled by curiosity, disobeyed this command, whereupon there flew out all the ills that beset body and mind of man. One thing only remained, Hope. Other accounts relate that the jar contained blessings, not trials, which, barring Hope, escaped.

Pango'lin, an Old World member of the Pangolin Family and related to the Anteaters. It has the distinction of having the longest tail of any Mammal, for its caudal appendage consists of 49 vertebræ and is always at least twice as long as the body. The limbs are short and the forelegs have long claws which are doubled under in such a way that the animal walks upon the backs of them. The limbs and the body, which slopes to both head and tail, are covered with reddish scales that are soft when the animal is young, but harden with age and form a protective plate armor. When attacked the pangolin rolls up within this blanket of scales and forms a hard-shelled ball which its enemy may roll but cannot open. Ants and termites form the food of the pangolin, and are scooped into its mouth by means of its long, slender tongue.

Panic, *Pan' ik,* an economic crisis, resulting in the general depression of business. Panics usually follow periods of prosperity and business expansion. They are due to various causes, such as overproduction, overtrading, attempting to do too much business on credit and speculation in stocks. A panic usually starts with the failure of some large banking house, which carries down with it a number of smaller institutions with which it is closely identified. Depositors become frightened and make a run on the banks. Many of them have obligations due which they expect to meet with their balances in the bank. If these are not available, their obligations cannot be met, and this condition extends through the community or country. Business becomes paralyzed, money is hoarded and credit can scarcely be obtained. From such a state of affairs, business recovers very slowly.

Among the financial panics of England were those of the years 1799, 1815, 1825-6, 1847, 1857, 1866, 1873, 1885 and 1890.

Those in the United States occurred in the years 1814, 1837, 1857, 1873, 1884, 1893 and 1907.

The panic of 1893 illustrates the working out of a crisis and its effects. It extended into every trade and industry. Over 570 banks and banking institutions failed. Among many the evils and damages were permanent. Clearing-house certificates were in general use. Railways representing a mileage of 39,000 went into the hands of receivers; commercial failures with liabilities of $346,000,000 were reported; men were out of work; and riots were frequent. The period of depression was long and tedious.

National crises occur as a result of overrapid financial development of a country. What are popularly known as "booms" are often accompanied by panics because of the fact that financial adjustment is impossible when changes occur too rapidly. Local and temporary crises are caused by speculation, tariff or failure of crops.

Panorama, *Pan" o rah' ma,* a representation of an entire scene as viewed from one point. It generally consists of a painting arranged around the walls of a cylindrical-shaped building, together with objects to heighten the perspective, as well as the realistic, effects, and a central platform from which to view the same. The *Siege of Paris* was a painting exhibited in 1875-6 in panoramic form in the principal cities of the world, followed in 1888 by that of the *Battle of Gettysburg* and other war and Bible scenes. In arranging these paintings, many articles are used to heighten the illusion; for instance, a broken cannon wheel, apparently sunken in the ground, and muskets, swords and other military paraphernalia and accouterments scattered on the floor in front of the picture, but so placed as to seem a part of it.

Pansy, *Pan' zy,* a favorite cultivated plant of the Violet Family, introduced from Europe and grown in beds and gardens all over the United States. The plant has small, rounding leaves with juicy stems. The flowers are borne singly on the stems and are made up of flat, velvety petals surrounding a golden center. The pansy has a variety of names. Our common name is derived from the French *pensée,* the pansy being the symbol of thought. Shakespeare calls it love-in-idleness. Other fanciful names are heart's-ease, five-face-under-hood, battlefield flower, monkey's face and Johnny-jump-up. The last name is applied only to the smaller, longer-stemmed species. There are many varieties in cultivation.

Pansy. See ALDEN, ISABELLA MCDONALD.

Panthe'on, The. See ROME, ANCIENT.

Pan'ther, a name applied in America to the cougar or puma and elsewhere to the leopard, especially the black species. See PUMA; LEOPARD.

Pan'tomime, the dramatic representation of ideas and emotions by gestures and attitudes rather than by words. This art was developed among the Romans, but, as their actors wore masks, it is evident that facial expression was not a factor in their mimicry. Commonly, however, a chorus sang, as interlude or accompaniment, the story represented by pantomimic action. In Italy and France there has usually been more interest in such efforts than in England; yet, since the first English exposition of pantomime at Drury Lane in 1702, the success of *The Necromancer,* at Lincoln's Inn Fields, in 1723, and further development in Joseph Grimaldi's *Mother Goose,* at Covent Garden in 1806, subjects for many pantomimes have been found in such popular tales as *Aladdin, Blue Beard, Cinderella* and *Little Red Riding Hood.* Pantomime has served on many occasions, both in England and the United States, to fill the theater's treasury and to supplement the legitimate drama.

Pa'pacy. See POPE.

Pa'pal States, or States of the Church, that section of central Italy which, till 1870, belonged to the popes. This territory was first claimed by the Church in 755, when Pippin, King of the Franks, defeated the Lombards who

were ravaging the Roman lands, and bestowed upon the Papacy the territories of Rome and Ravenna, besides Bologna and Ferrara, with a large section on the Adriatic. In 774 Charlemagne defeated the Lombards, who were a third time attacking Rome. He then not only confirmed the Grants of Pippin, but added new territories to the first grant. Matilda of Tuscany made a free gift of her possessions. During the political troubles of the centuries, much of the Church property was repeatedly lost and regained. When greatest it comprised 17,218 sq. m., with 3,124,668 inhabitants. After the Austro-Italian war in 1859 it was reduced to 4891 sq. m. with 692,106 inhabitants. Though the Italian ruler had bound himself in 1866 to respect the Papal States, King Victor Emmanuel took Rome by force in September, 1870, when a vote of the people was taken under military supervision, 133,681 favoring Sardinian control as against 1807 for the popes. Rome, therefore, became the capital of Italy in July, 1871. The pope is still supreme in the Vatican, which is regarded as extra territorial domain and never entered by the army of Italy.

PAPAW

Papaw', or **Paw'paw''**, a fruit-bearing tree of the Custard Apple Family, growing in southeastern North America and frequently cultivated for ornament. It has a slender, cylindrical trunk with somewhat erect, branching stems, which bear long, narrow, deeply-lobed leaves, broader above the center and tapering below. The flowers are ill-smelling purple blossoms with three broad sepals and two rows of petals, one reflexed and one erect. The fruit has a thin, brittle rind, yellowish-green at first but becoming dark brown or even black as it matures. The pulp is soft and sweet and of a bananalike consistency; it contains many large seeds. Papaws are very common in the Mississippi Valley and their fruits are sold in large quantities in cities of the South.

Pa'per, a flexible material made of vegetable fibers, formed artificially into thin sheets for writing and printing, and fabricated into other forms for a large variety of purposes. The word *paper* is derived from papyrus, the name of a plant whose inner bark was used by the Egyptians as early as 2400 B. C. to form a fabric upon which they wrote. See PAPYRUS.

HISTORY. It is not known who was the original paper maker. Wasps build their nests out of a sort of paper made from vegetable fibers, and paper for commercial purposes is made by a somewhat similar process. It is claimed that a Chinese statesman was the inventor of paper, and we find in Chinese writings that a fabric made of silk waste was used to write upon as early as 300 B. C. Paper, is, no doubt, of Asiatic origin, and was used in China, Formosa and Korea before the Christian Era. The first rag paper in Europe was made in Spain during the Moorish Conquest in 1154, but it was soon afterwards made in Italy, France and Germany. It was not until the beginning of the 14th century that paper was commonly used in England, but in 1685 it began to be made there, and for many years the English handmade paper excelled that of other countries, particularly for fine books. In 1690, William Rittenhouse built the first paper mill in the United States, near Germantown, Pa., but it took over 100 years to develop the paper industry in

this country. The making of paper in quantities is now confined to Europe and North America.

MANUFACTURE. Formerly all paper was made by hand from linen and cotton rags, and while $14,000,000 worth of rags are now used each year in this country, they form only a fifth of the material available for paper making. Paper is demanded in such enormous quantities for newspapers (See NEWSPAPER) and for books that it has been necessary to find other materials besides rags; therefore the fiber of wood, such as that of spruce, poplar and similar woods, is now extensively used in making this class of paper, which is known as wood-pulp paper. Jute, straw, hemp, esparto (a Spanish straw), cotton, cornstalks and bagasse (the refuse of sugar cane), as well as peat, all furnish paper-making materials.

Handmade Rag Paper. When rags are used exclusively and the making of paper is by hand, the rags are dusted, sorted and cleaned, after which they are washed in hot water with chloride of lime to bleach them. They are then cut up or ground into a fine pulp, the consistency depending upon the thickness and quality of the paper desired. The tank containing this pulp and water is continually stirred, in order to make an even distribution of the pulp, to which a sizing or filling is added. Into this tank shallow boxes, called deckles, having bottoms made of wire screens with fine meshes, are dipped. The water is allowed to drain out as the box is raised, and a thin coating of pulp is evenly distributed over the screen. After the water is drained out, the box is inverted over a felt blanket, upon which a thin layer of this pulp is deposited and allowed to remain until the pulp is dry enough to hold together, when it can be removed to a drying room. When dry, this layer of pulp becomes a sheet of paper, the size of the sheet depending upon the size of the deckle. These sheets are now pressed to give them a smooth surface and greater strength, but they are rough on the edges and the surface is more uneven than that of machine-made paper. Some of the Oriental peoples still continue to make paper in this crude manner, and produce an article of high grade.

Wood Pulp. There are two kinds of wood pulp used in paper making: mechanical pulp, or ground pulp, and chemical fiber. The latter is made by three different processes: the soda, the sulphide and the sulphate processes, depending upon the chemicals used.

In making pulp, wood is ground by pressing blocks by hydraulic pressure or a screw on rapidly revolving grindstones, a stream of water carrying off the product, which is afterwards screened to remove lumps and splinters. It is then usually bleached and run into the beaters ready to be made into paper. Pulp is often made in a separate mill, which may be a long distance from the paper mill. The pulp is then shipped in sheets or receptacles, whichever is most economical.

The oldest process of making chemical fiber is the soda process, patented in England in 1854. A soft wood is barked, broken in small pieces and boiled under steam pressure with a solution of caustic soda, which dissolves everything but the cellulose (See CELLULOSE), which, when washed and bleached, produces a soft, white fiber. The sulphite process is an American invention, and employs in its improved form bisulphite of calcium instead of soda. The wood is placed in a digester, a tall tank 50 ft. high and about 15 ft. in diameter, lined with acid-resisting brick, and holding 20 tons of wood. Steam at a pressure of 80 lb. is turned on the wood, and a solution of bisulphite of calcium is forced into the digester by a pump. This process produces a strong fiber of good color that is not in all cases required to be bleached. The sulphate process consists in using sulphate of soda instead of caustic soda.

Paper Making. It is a common practice in America to combine the pulp of rags with that of wood fiber, and in making paper for newspapers, and for similar uses, 70 per cent wood fiber, 20 per

FROM TREES TO BOOKS

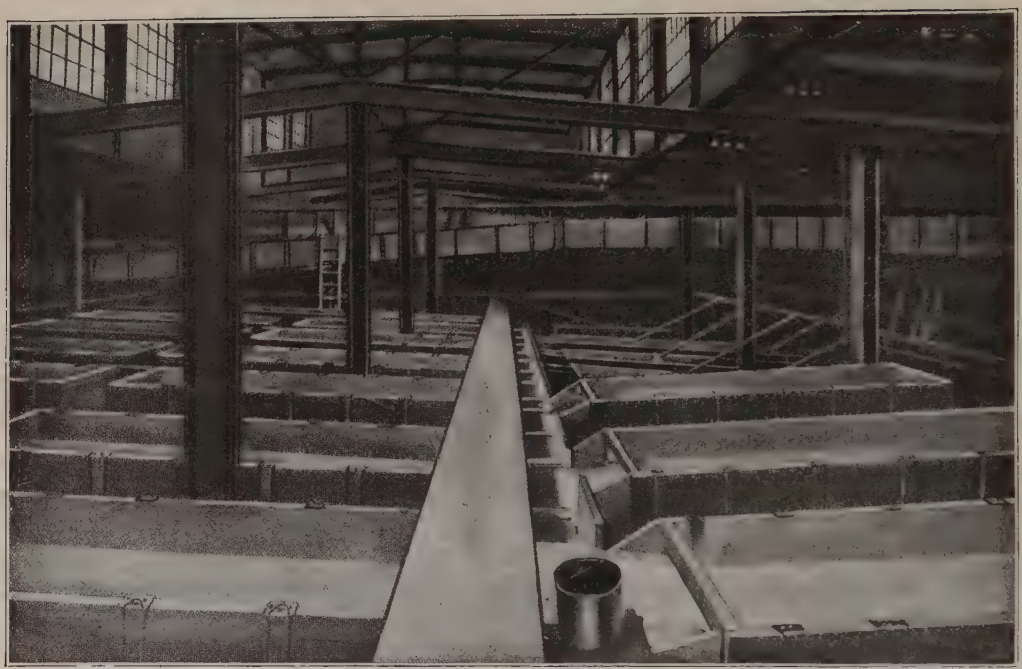
The trees of the forest—pine, spruce, basswood and others—are cut down and sawed into logs the same as in lumbering. By modern methods a tree can be made into paper in 24 hours.

The logs are taken by team and train to the saw and pulp mills. About 70 per cent of the material entering into paper used for newspapers and books is wood fiber.

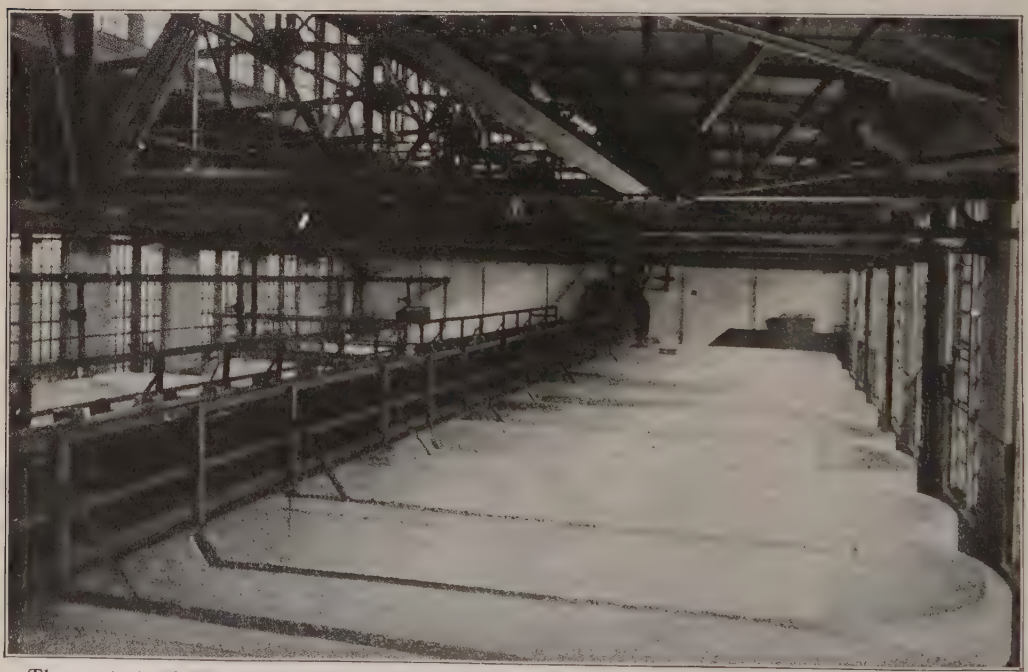
When the logs arrive at the pulp mill they are sawed into lengths of about two feet for grinding into mechanical pulp, or made into chips for the sulphite process, which consists in boiling the chips in a solution of carbon bisulphite in huge boilers.

All photos by courtesy of the West Virginia Pulp & Paper Co.

PREPARING THE PULP



The pulp goes to the screen room, where it is passed through plates perforated with slits only 1-100 of an inch wide, to remove all slivers and dirt. This is necessary to insure a perfect paper.



The next step is bleaching the pulp to a snow-white color. Lye, lime, chloride of lime and solutions of chlorine are used as bleaching agents.

After bleaching, the pulp is sent to the beaters, or Hollanders, where the desired proportion of rag pulp and of China clay is mixed with it. It is then beaten until prepared for the paper-making machine. The beater consists of a hollow cone with a series of knives on the inner side, and within this a revolving cone with a similar series of knives on its outside. The pulp is ground between these sets of knives, which can be adjusted to secure various degrees of fineness.

The Fourdrinier machine is the most ingenious invention connected with paper making. It is from 150 to 180 feet long, and receives the pulp at one end and turns out the finished paper at the other. One of these machines will make about 500 feet of paper a minute and produce a sheet from 120 to 160 inches wide.

MAKING PAPER READY FOR PRINTING

Paper comes from the Fourdrinier machine in a continuous band which is usually wound into rolls. These are taken to the cutting room, where they are cut into sheets and narrower rolls, to adapt the paper to the various uses for which it is desired.

For printing engravings and other high-grade illustrations such as those found is this work, a paper with a very high grade of finish is required. To produce this finish the paper is coated with a solution of gum and China clay, and then highly calendered. This illustration shows the paper in the drying room before calendering.

cent rag pulp and 10 per cent China clay are used. The clay acts as a filler and adds to the finish of the paper. These ingredients are mixed in the beating engines with a size made of rosin soap dissolved in caustic soda and precipitated by an alum solution. For the reduction of the pulp into a very fine mass, the Jordan Engine is used. This consists of a stationary hollow cone mounted with knives on the inside. This cone fits over and engages with a solid, rapidly revolving cone supplied with similar knives on the outside. This cone is on a shaft, and is made adjustable so that as the pulp passes between the cones the knives can be brought together or separated with great accuracy in order that the desired degree of fineness may be secured. The pulp is pumped from this machine to a receiving tank, where it may be bleached or colored.

The Fourdrinier machine takes its name from its inventor, and is the most complete machine for the manufacture of paper in existence. It consists of three parts, which, when joined together, make a machine 180 ft. long. The first part consists of the deckle, which performs the same function on a large scale that the old hand deckle did on a small one. The first part, the paper-making part of the machine, is the most delicate as well as the most interesting. It consists of the deckle, an endless belt of wire gauze about 30 ft. long and the width of the sheet of paper. On this belt the pulp is spread as it flows from a tank. This flow is adjusted to the weight of paper desired, and the same machine can make tissue or newspaper by regulating the pulp. Beneath the deckle are two suction boxes, used to draw the water from the pulp. The belt of wire gauze passes over a series of rollers so arranged as to give it a vibratory motion, which distributes the pulp evenly over the gauze and also weaves it together, so as to make a sheet of uniform thickness and strength. The dandy roll placed above the belt of gauze between the suction boxes is a light cylinder covered with wire. It is so adjusted that it passes upon the upper surface of the layer of pulp and impresses upon the paper whatever design it bears. If the roll is covered with a wire mesh similar to that of the belt, a "wove" paper is formed. If it has parallel wires extending from end to end a "laid" paper is formed. The water mark, which is the imprint of the brand, is also on this roll and is impressed at each revolution. As the pulp passes over this belt, most of the water is drained out. It is then taken on a belt of felt and passed between a number of steam-heated steel rollers, which remove nearly all of the remaining moisture. As it leaves the last set of these rollers, the paper is separated from the felt and passes on through other rollers, which subject it to great pressure and further dry it and give it a smooth surface. The finished paper is delivered from the machine in rolls or sheets, according to the purpose for which it is intended. One of these machines is usually 18 ft. wide and 16 ft. high, and will turn out 500 ft. of paper per minute of a width of 160 or 120 inches. One paper-making corporation operates 32 mills and uses 96 of these machines.

Varieties. Coarse grades of paper and strawboard are made from wheat straw, esparto fiber and corn husks. The best quality of paper is known as linen paper, as formerly it was made from linen rags. Manila paper gets its name from Manila hemp, from which it was originally made. Much of the best book paper, especially that for printing illustrations, requires a high finish and a very smooth surface. This is given by passing the paper between alternate iron and compressed paper rolls. The paper is called supercalendered from the name of this machine. A large amount of paper is given a surface coating after it is made, that required for lithographic work (See Lithography) being usually coated with clays and glue or casein, while those for covering boxes, etc., are glazed by passing between a top roll of heated metal revolving faster than a lower roll of compressed cotton; a high

luster is given by using beeswax as a coating. Wall paper is printed from paper in the roll (See PAPER HANGINGS).

USES. Paper is used for many articles by being compressed and chemically treated (See PAPIER-MÂCHÉ). By a secret process a thread and yarn, known as zylolin, are made, which can be loosely or tightly spun and woven into fabrics, from which clothing of a durable character is made; this clothing is easily washed and ironed. Rugs, mats and carpets are made of this material and colored in fanciful designs in imitation of the rich Oriental rugs.

STATISTICS. There are about 1200 paper-making mills in operation in the United States. These make about 500 tons of writing paper per day, and the production of paper in rolls and sheets for newspapers is about 600,000 tons per year. The total paper consumption is 3,000,000 tons per year, of which 80 per cent becomes waste in three to five years. The mills of a corporation located at Millinocket, Me., require over 27,000-horsepower to operate their machinery and to furnish steam for cooking, dyeing, etc. Another paper-making corporation is capitalized at $110,000,000. The United States is the largest manufacturer of paper.

Paper Hangings, or **Wall Paper,** a term applied to webs of paper employed to cover walls and ceilings, usually for decorative purposes. The Chinese used paper hangings at a very early period, but they were not generally introduced into other countries until the 18th century. However, hangings of canvas, decorated and painted to imitate tapestry, were in common use 200 years earlier, and the manufacture of hangings of embossed leather was carried on in Italy and Spain during the 16th and 17th centuries, and later in France and England.

The first wall papers introduced were in imitation of these various hangings of tapestries, velvets and leather, and were made in sheets 22 inches by 32 inches, pasted together to form a length of 12 yards. These sheets were at first printed from blocks manipulated by hand, the pattern, or that which was to be in one color, being carved upon pear-wood boards; the delicate parts of the design were represented by small pieces of copper set in the block. These were fed with color by having a felt blanket soaked in the pigment and applied to the paper one tint at a time. When one tint was dry, it was followed by other blocks until all the colors and figures of the design were printed on the paper.

After the introduction of wall-paper printing machinery in England, the size of wall paper was changed to webs 21 inches wide and 12 yards long. The printing machine contained a large drum, grouped around which were a number of wooden rollers made in a similar manner to the blocks above described and each representing some part or color in the design. Through these were fed the paper webs very slowly and carefully in order that each roller might perform its part in the proper way and complete the design. Various improvements were later introduced until the development of grounding machines for putting on the background and bronzing machines for applying the powders in imitation of gold; embossing machines and a number of other devices were invented in order to produce the continuous process by which the paper passes automatically from one stage to another. All this was consummated in 1870, but great improvements in the blending and selecting of colors in which wall papers are now printed have been made since that date. The first wall-paper printing machine was put up in Philadelphia in 1844, and the business has gained rapidly in importance; the value of the product in the United States exceeds $12,000,000 a year, and there are about 40 factories employing over 7000 men. See PRINTING; TAPESTRY.

Paper Money. See MONEY, subhead *Paper Money.*

Paper Nau'tilus, or **Ar'gonaut,** a genus of Cephalopods of the Octopod Family. It resembles the cuttlefish in structure and in possession of an ink sac; but it

has no external skeleton and the female bears a coiled, ribbed shell, from which eight sucker-covered arms protrude. Two of these arms are broadly flattened and were once supposed to be held in air as the animal sailed across the sea. There is no muscular attachment between the female nautilus and its shell, but the flattened arms grasp the edges tightly whenever discretion tells the nautilus to descend beneath the waves; at the same time the ink sac exudes a dark-colored liquid, which conceals the flight until a safe refuge in the mud has been reached. These broad arms are also the implements with which the nautilus rebuilds any injured portion of its shell or adds to it when the structure becomes too small.

The paper nautilus is found in many warm seas, but chiefly in the Mediterranean, where the fishermen frequently take them up with their nets. Occasionally they are used as food, but are not highly valued for that purpose.

Papier-Mâché, *Pa″ pya′-Mah″ sha′*, a general term given to materials formed by molding or pressing wood pulp or sheets of paper together so as to resemble wood. Many different methods of manufacture are employed. One process consists of taking a number of sheets of paper and thoroughly saturating them with water, then pressing them into a mold. The articles thus formed are then dried by heat and dipped into a mixture of linseed oil and tar, then baked, trimmed, planed and painted with several coats of tar and lampblack. Finally they are varnished, lacquered and polished ready for the market. Sometimes articles are inlaid with mother-of-pearl or otherwise ornamented.

Papier-mâché was first made in Persia, afterwards in India, China and Japan, and finally in France, Switzerland and Germany. Many varieties of articles are made of papier-mâché, chiefly those for ornamental purposes, such as boxes, trays, vases and light articles of furniture and architectural adornment. However, papier-mâché household articles, such as pails and tubs, are becoming common. When wood pulp is pressed to form car wheels and in making a mold of type for stereotyping, it is sometimes called papier-mâché. See PAPER.

Papineau, *Pa″ pe″ no′*, **Louis Joseph** (1789-1871), a Canadian politician, born at Montreal, Canada. He studied at the Seminary of Quebec, and prepared for the practice of law. In 1809 and again in 1811 he sat in the Legislature of Lower Canada. He served in the War of 1812 with the rank of captain. In 1834 the "Ninety-two Resolutions," of which he was one of the authors and which insisted upon certain changes in the government, were sent to England. The "Resolutions" were not adopted and the Canadian people were warned against agitators. The next year Papineau arranged with William Lyon Mackenzie, the leader of the Revolutionary Party of Upper Canada, for a union of their interests. When the revolution finally broke out he fled to the United States, and later went to France, returning to Canada when a general amnesty was proclaimed in 1847.

Papua, *Pap′ oo ah*. See NEW GUINEA, *Gin′ y*.

Papy′rus, a large, reedy marsh plant of the Sedge Family. Its straight stems grow to a height of from 4 to 16 ft. but are entirely destitute of foliage, for the leaves, which are sharp-edged and coarse, spring from the same spreading rootstock as the stem. At the summit the stem divides into a cluster of shortened, umbrellalike branches. The flowers grow in short spikes and have neither petals nor sepals, but are surrounded by bristles, which, after the seeds are formed, lengthen into long hairs. Papyrus formerly grew in profusion in Egypt and Palestine, but it is now only sparingly found along the Upper Nile and is more common in Syria and southern Italy.

Papyrus is chiefly interesting from a historical standpoint, since it was used for writing material as early as 2000 B. C. before the clay tablets and stylus were known. It was prepared by cutting the inner bark, or outer pith, in thin strips which were laid side by side; over them other strips were laid crosswise. These

were then subjected to a high pressure, which, on account of the gumminess of the pith, fastened the two tightly together. The sheets were written upon with a reed pen with an ink made from charcoal and were rolled upon sticks while fresh; as the rolls stiffen with age, they are less easily unrolled. Because of the dryness of the Egyptian climate, many papyrus manuscripts of great age have been preserved; a large collection of them, most of which have been translated, lies in the Berlin Museum.

Papyrus fiber is now used in the manufacture of rope, sailcloth, sandals, coarse garments and mats. Lately it has been applied also to the manufacture of modern paper. Papyrus is said to be the bulrush mentioned in the Old Testament.

Pará, *Pah rah',* or **Belem,** *Ba leng',* a city and seaport of Brazil, capital of the State of Pará, situated on the right bank of the estuary of the Pará River. Among the chief buildings are the cruciform cathedral, the bishop's palace, the Episcopal Seminary, the government and municipal palaces, the Peace Theater and several hospitals and colleges. The port is the entrance of the Amazon Valley and Pará is the principal commercial city in northern Brazil. The chief exports are cocoa, rubber, Brazil nuts, rice, drugs, isinglass, palm fiber and deerskins. The city was founded in 1615; the inhabitants, including those of the surrounding rural districts of the municipality, are largely Portuguese and Indian. Population, about 200,000.

Parachute, *Pair' a shoot,* a device shaped like an umbrella, but without the ribs, and usually about 25 ft. in diameter when opened. It has a small circular opening in the center. It is shut and attached to a balloon by cords, so that the aeronaut, when wishing to descend by reason of accident to the balloon or otherwise, pulls certain cords, which let the parachute free, and in its descent it spreads out, allowing him to descend slowly. Its invention is accredited to Sebastian Lenormand (1784). See BALLOON.

Par'affin, a material consisting of a mixture of several hydrocarbons, having a colorless, translucent, waxy composition, and without taste or smell. It is chiefly and most economically obtained from petroleum and other liquid oils by distillation. It is also produced when bituminous shale, coal, wood, lignite or peat is heated in retorts. Paraffin is extensively used in the arts. Mixed with wax it forms an important ingredient of candles, and it is employed in the manufacture of wax or paraffin paper. See PETROLEUM.

Paraguay, *Par' a gway,* a small republic of South America, bounded on the n. by Bolivia and Brazil and on the e., s. and w. by Argentina. The Pilcomayo River marks its western limits, and the Paraná its eastern, while the Paraguay, a great tributary of the Paraná, crosses it centrally. Its area is 171,200 sq. m., or about the same as that of Kentucky, Tennessee, Alabama and Mississippi combined. The adjoining republic, Bolivia, is over four times the size of Paraguay.

PHYSICAL CHARACTERISTICS AND CLIMATE. Paraguay is, in general, a region of low elevation. Its mountains, which lie in the north and east, are little more than high hills, nowhere more than 1400 ft. in height. In the south the country is swampy, and rice is abundantly raised. The climate of Paraguay is tropical, but healthful, and the fertility of the soil renders vegetation so luxuriant that the scenery has a softness of beauty that renders it especially attractive. The great forests are a source of valuable dyewoods, timber, drugs, oils, perfumes and gums. Maté is a shrub whose leaves furnish the tea of the inhabitants. On the cultivated tracts sugar, tobacco, cotton, maize and vegetables are raised, and great herds of cattle graze upon the hills. The greater part of Paraguay lies in the Gran Chaco regions where lakes are plentiful in the rainy season, but disappear during the drought. The exports of the country are maté, tobacco, sugar, quebracho, rubber, hides, tallow, cattle, wool and leather.

GOVERNMENT, PEOPLE, ETC. The government of Paraguay is administered by a president, and its Congress consists of a Senate and a House of Deputies, whose members are elected directly by the people. The country is divided into 20 counties. The people are of mixed Spanish and Indian descent and are of a high type of civilization. Education is encouraged, and at Asuncion, the capital, are a national college and an agricultural college. Catholicism is the principal religion.

HISTORY. Originally Paraguay belonged to Spain, and the first settlement was made by 600 adventurers at Asuncion in 1536. About 1586 Jesuits entered the country, ruling it from 1609 to 1768. Early in the 19th century Paraguay was freed, by one blow, from Spain. José Francia, secretary of the revolutionary junta of 1811, became one of its two consuls. In 1816 he was made absolute and perpetual dictator, and actually was, for the following 25 years, "the Government of Paraguay." His policy was one of complete isolation, commercial and political.

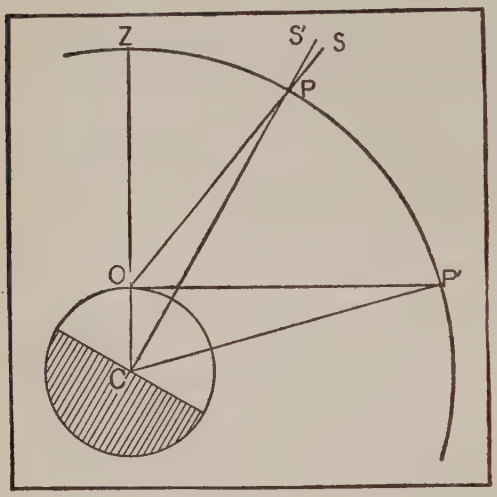
In 1844 Carlos Antonio Lopez became president for a nominal term of ten years, which, however, meant for life. His tendencies were liberal, and in 1845 he opened the country. In 1862 he was succeeded by his son, Francisco, who had been his minister of war. The new ruler made commercial treaties with the United States and the leading powers of Europe, and most ably promoted agriculture and home industries. But a war against Brazil and Argentina, 1864-1870, almost annihilated Paraguay. For the following few years the country was under a Brazilian protectorate. By 1876, however, it was free from foreign control. Later a popular constitutional government was established. Paraguay has been singularly free from civil strife, and, in consequence, has since made favorable strides in population and prosperity. It is on most friendly terms with its neighbors. Population, 752,000.

Paraguay River, a long river of South America, rising by many branches in mountains of southwestern Brazil. It flows in a southerly direction, forming for a distance the boundary between Brazil and Bolivia. The Paraguay was once the western limit of the Republic of Paraguay, but the Pilcomayo, a western branch of the Paraguay, now marks its boundary. Beyond their juncture, however, the two rivers separate Argentina from Paraguay, and at the extreme southwestern angle they join the great Paraná, under which name all flow into the broad estuary of the Plata. The river is 1600 m. long and is a regular means of communication between Asuncion and Buenos Aires. Asuncion, the capital of Paraguay, is situated near its union with the Pilcomayo.

Paraguay Tea. See MATÉ.

Par'allax, the difference in the direction of an object as seen from two different places. There are two kinds of parallax: diurnal parallax, which becomes horizontal parallax when the object observed is at the horizon; and annual parallax. In astronomical calculations the position of a star as seen from the earth's surface is called its *apparent* place, and as seen from the center of the earth is called its *real* place. In the illustration let C be the center of the earth; O, point of observation on the surface of the earth; Z, the zenith; and P, the star under observation. The line OP′ is the horizon and perpendicular to the line CZ passing through the center of the earth. Now, seen from O, the star is seen at S. If the observer were at C, however, the star would be seen at S′, or at the same place as if it were seen from the center of the earth. Yet the star is really in the same place for all observers. Therefore it is agreed among astronomers to reduce all their calculations to the place a star would seem to occupy if seen from the center of the earth, called its real place. The angle OPC is the angle of parallax. The *horizontal parallax* of a star is the angle made at the star by a line drawn from the center of the earth, and the horizon line. The parallax of a star higher in the sky, as at S′, is at the apex of a

smaller angle formed by lines drawn from the center of the earth and the point of observation. As the star rises higher toward the zenith (Z) the angle measuring its parallax grows constantly smaller until at the zenith it is nothing, the line from the center of the earth passing through the point of observation.



PARALLAX

Annual parallax is estimated upon the same principles; but a line drawn from opposite points of the sun's orbit instead of the radius of the earth is taken as a base. Parallax is an exceedingly important element in astronomy, for upon it astronomical measurements depend, as the distance of sun, moon and stars. It is also exceedingly important in nautical estimates of latitude and longitude.

Paral'ysis, or **Pal'sy,** a partial or total loss of the power of motion, due to interruption of the nerve impulses, which stimulate the muscles to normal activity. In some cases there is a loss of sensation, but not of motion, while in others the power of motion is lost, but sensation remains. Paralysis may affect the right or the left side of the body or the upper or lower extremities. It is rather a symptom than a disease, and may be caused by a wound or other abnormal condition in the nerve trunks or in the nerve centers of the brain, spinal cord or ganglia. A clot of blood on the brain is a not infrequent cause of paralysis. Persons may recover from a stroke and appear to be restored, but one attack predisposes to others. The second or third manifestation is often followed by death. See NERVOUS SYSTEM.

Paraná, *Pah" rah nah',* a large river of South America, is formed in the State of Minas Geraes, in Brazil, by the confluence of a number of small streams. It flows southwesterly, then westerly, forming the boundary between Paraguay and Argentina on the south. It then receives the Paraguay and flows southeasterly. After it is joined by the Uruguay it forms the broad estuary known as the Plata or Platte. Its length is estimated from 2200 to 2800 m. Just as it leaves Brazil it is precipitated over a ledge forming the Falls of Guayrá, and immediately below is a series of rapids. Because of these obstructions navigation is restricted to the lower part of the river. Large vessels ascend as far as Rosario. The Paraná, next to the Amazon, is the largest river of South America.

Par"asit'ic Diseases. See BACTE'RIA.

Parcel Post. The Sixty-second Congress enacted a law establishing a limited parcel post within the United States and its outlying possessions. The law became effective Jan. 1, 1913. For purposes of the administration of the parcel post the United States and its outlying possessions, excepting the Philippine Islands, are divided into units of area 30 minutes square, identical with a quarter of the area formed by the intersection made by the parallels of latitude and meridians of longitude, as represented on authorized postal maps of the country. These units are made the basis of eight zones. The first zone has a radial distance of approximately 50 m. from the center; the second, a radius of approximately 150 m.; the third, of 300 m.; the fourth, of 600 m.; the fifth, of 1000 m.; the sixth, of 1400 m.; the seventh, of 1800 m.; and the eighth, all territory beyond the seventh, excepting the Philippine Islands, which are excluded from the privileges of the law.

Parcels cannot exceed 84 inches in length and girth combined, and are limited to 50 lb. in weight, except within the first and second zones, where the limit is 70 lb. Parcels must be so wrapped that their contents will be amply protected, and that they can at the same time be readily examined by the postal authorities. The name and address of the sender following the word *From* must be placed on the wrapper. They must be mailed at the post office or a postal station, or be delivered to a rural or other carrier duly authorized to receive them. Postage must be fully prepaid by stamps. Large firms may, by special arrangement, pay the postage in money. Special delivery may be secured by payment of the usual fee of ten cents, stamps for which must be affixed to the parcel. Insurance of contents up to the value of $50 may also be obtained by payment of a fee of ten cents. The preceding table issued by the post office department gives the rates of postage for parcels ranging from 1 to 20 lb. The local rate for parcels weighing 50 lb. is $0.30; the zone rate is $0.54. These rates do not apply to packages less than four ounces in weight.

The following articles are not mailable:

Wine, malt, fermented or intoxicating liquors of any kind.
Poisons of any kind.
Poisonous animals, insects and reptiles.
Explosives and inflammable materials (These include matches, kerosene oil, gasoline, naphtha, benzine, turpentine, denatured alcohol, etc.)
Infernal machines.
Chemicals or other devices or compositions that may ignite or explode.
Disease germs.
Revolvers.
Live or dead animals, birds or poultry. (Stuffed animals excepted.)
Rawhides, pelts, game or any article having a bad odor.
Matter that is manifestly obscene.

WEIGHT	First Zone		2d Zone, 50 to 150 miles	3d Zone, 150 to 300 miles	4th Zone, 300 to 600 miles	5th Zone, 600 to 1000 miles	6th Zone, 1000 to 1400 miles	7th Zone, 1400 to 1800 miles	8th Zone, all over 1800 miles
	Local rate	Zone rate, 50 miles	RATE	RATE	RATE	RATE	RATE	RATE	RATE
1 pound	$0.05	$0.05	$0.05	$0.06	$0.07	$0.08	$0.09	$0.11	$0.12
2 pounds	.06	.06	.06	.08	.11	.14	.17	.21	.24
3 pounds	.06	.07	.07	.10	.15	.20	.25	.31	.36
4 pounds	.07	.08	.08	.12	.19	.26	.33	.41	.48
5 pounds	.07	.09	.09	.14	.23	.32	.41	.51	.60
6 pounds	.08	.10	.10	.16	.27	.38	.49	.61	.72
7 pounds	.08	.11	.11	.18	.31	.44	.57	.71	.84
8 pounds	.09	.12	.12	.20	.35	.50	.65	.81	.96
9 pounds	.09	.13	.13	.22	.39	.56	.73	.91	1.08
10 pounds	.10	.14	.14	.24	.43	.62	.81	1.01	1.20
11 pounds	.10	.15	.15	.26	.47	.68	.89	1.11	1.32
12 pounds	.11	.16	.16	.28	.51	.74	.97	1.21	1.44
13 pounds	.11	.17	.17	.30	.55	.80	1.05	1.31	1.56
14 pounds	.12	.18	.18	.32	.59	.86	1.13	1.41	1.68
15 pounds	.12	.19	.19	.34	.63	.92	1.21	1.51	1.80
16 pounds	.13	.20	.20	.36	.67	.98	1.29	1.61	1.92
17 pounds	.13	.21	.21	.38	.71	1.04	1.37	1.71	2.04
18 pounds	.14	.22	.22	.40	.75	1.10	1.45	1.81	2.16
19 pounds	.14	.23	.23	.42	.79	1.16	1.53	1.91	2.28
20 pounds	.15	.24	.24	.44	.83	1.22	1.61	2.01	2.40

The local rate is applicable to parcels intended for delivery at the office of mailing or on a rural route starting therefrom.

Parchment, the skins of a goat or sheep specially prepared for writing upon them. The skins are first soaked in lime to remove the hair; they are then scraped, shaved, washed, stretched and dried on frames. They are then rubbed with chalk and pumice powders to make them smooth. Parchment was used by

the ancients instead of writing paper and is still in demand for fine books and important documents, as well as for diplomas. Vellum is a very fine parchment made of the skin of a kid.

Pardon, the remission of the penalty of a crime or offense. A pardon may be granted before or after conviction, but usually the pardoning power is never applied until after sentence has been pronounced. A pardon is almost always an executive function, the power being held in the state by the governor, and in the nation by the president. In some states, however, this power is given to a state board of pardons before whom all applications for clemency must be made. When there is no state board of pardons the governor is given discretionary power. The Constitution of the United States vests the president with full pardoning power in all Federal cases, except that he cannot pardon one who is found guilty of any misdemeanor as the result of impeachment proceedings.

Parent and Child. Under this title are usually considered the legal relations existing between father and mother and children. This article treats of these relations as they exist with the legitimate children only. Parents are the natural and legal guardians of children and are entitled to their custody. Within reasonable limits they have the right to inflict punishment upon the child for misdemeanor, but excessive punishment, cruelty and abuse may lead to civil or criminal action by the proper authorities. According to common law, parents are not compelled to support their children, but this has been changed by statute in most cases so that they are made responsible, and neglect of such duty is subject to criminal action. In case the parent dies without a will, each child is entitled to an equal share of the property that falls to the children. The parent is not liable for crimes or other breaches of the law committed by the child, unless they were committed at his instigation.

Paris, *Pair' is,* in Greek myths, son of Priam, King of Troy, and of Hecuba. Since it was predicted before his birth that he was to be the ruin of his country, he was exposed as a babe on Mt. Ida. A shepherd, however, rescued him and reared him as his own child. Later, grown, serving as a shepherd and happily married to the nymph Œnone, he was called upon to decide who should have the golden apple for which Juno, Minerva and Venus were contesting (See Apple of Discord). Meanwhile, Cassandra, daughter of King Priam, had recognized him as her brother and he had been acknowledged a royal prince. As such, and in accord with Venus's promise to him that he was to have the fairest woman on earth for a wife, he went to Sparta. Here reigned Menelaus, husband of Helen, whom Paris stole, thus causing the Trojan War (See Helen). It is not generally believed that Paris, effeminate and vain, was a gallant hero of the struggle, although he afterward treacherously shot Achilles in the heel. He himself died from a poisoned arrow of Philoctetes, the nymph Œnone refusing to cure his wound. See Trojan War.

Paris, the capital of France and of the Department of the Seine, and the literary, artistic and social center of Europe since the decline of Rome. It is frequently referred to as the "City of Pleasure," and is the home of the freshest thought, the latest and most splendid luxuries, the newest fashions and the most extravagant wealth. Situated on both banks of the Seine River, 233 m. from its mouth, it occupies the heart of the so-called Paris Basin, and has an altitude of from 80 ft. (at the exit of the Seine from its fortifications) to 420 ft. (the hill of Montmartre in the northern part of the city). A wall encircles the city, and the total area with its boundaries is 19,279 acres, while 8 m. of the river are enclosed within these limits. Paris is said to be the greatest fortress in the world and possesses three distinct rings of defense (known as the "enceinte," the circle of detached forts around it, and the "new works").

Streets, Squares and Parks. There are building laws and regulations now

PARIS

in operation that control effectively both the form and quality of the constructions that are to be erected, and as a result there is a homogeneity about its buildings that forms a pleasant contrast to the promiscuous assortment of edifices of many another capital. There is pleasing unity, but not monotony, in its uniform sky line as well as street line, and to this, as fully as to the imposing attractiveness of its buildings, the city owes its reputation for beauty and harmony. The principal streets are the line of boulevards known as the *Grands Boulevards,* containing some of the most celebrated avenues of the world. The streets are kept scrupulously clean, and their wideness and brilliance are very attractive to the visitor; the life in the streets (in the cafés and restaurants fronting the sidewalks), with their chatting throngs, laughter and music, is very impressive by reason of its distinct individuality. The most magnificent square in the world is the Place de la Concorde, laid out under Louis XV; others include the Place de l'Étoile (containing the Arc de Triomphe de l'Étoile, the largest triumphal arch in the world); the Place de la République; the Place de la Bastille; and the Place Saint-Michel. The Gardens of the Tuileries are situated in the very heart of the city and are adorned with long lines of trees, numerous statues and playing fountains and basins. Other parks are the Gardens of the Luxembourg, the Jardin des Plantes, the Champs Élysées, the Bois de Boulogne and the Bois de Vincennes.

Buildings and Monuments. Prominent among the public edifices of Paris are its numerous churches, the Cathedral of Notre Dame undoubtedly remaining the most impressive. In classical style are St. Sulpice, St. Roch and St. Paul-St. Louis; other churches are the Sacré Cœur, St. Étienne-du-Mont, St. Germain-des-Prés and La Madeleine. The Palace of the Louvre is the most important of its civil buildings (See Louvre, Palace of the). The Palais de Justice is situated near the western end of the island of the city, and was abandoned as a royal residence for the use of courts. South of it is the Hôtel de Cluny, distinguished for its carvings and the grace and beauty of its architecture. The Hôtel des Invalides, the Palais du Trocadéro, the École Militaire, the Palais de l'Élysée, the Grand and Petit Palais des Beaux-Arts, the Palais Royal, the Palace of the Luxembourg, the Panthéon, the Observatory and the Hospice de la Salpétrière are other important buildings. Among the theaters and places of amusements are the Opéra, Théâtre Français, Théâtre Italien and the Odéon, all of which receive government support and are under strict supervision of the police. The largest theater in the world is the new opera house completed in 1875 at a total cost of $5,600,000 for the building alone, exclusive of the site. It contains the world-famed Grand Staircase and the handsomely decorated Foyer, and is the home of the best that the world has to offer in theatrical attractions.

The principal educational institution is the University of France, the chief buildings of which are located in the famous Latin Quarter, south of the River Seine. A new and magnificent building has replaced the old Sorbonne, and its extensive library is open to the public. Among other schools are the School of Medicine and the School of Law, the Jardin des Plantes (containing immense botanical and zoological gardens) and the École Polytechnique. The largest library is the Bibliothèque Nationale, containing over 2,600,000 volumes. The principal art treasures are contained in the incomparable Louvre, the Palais, or École, des Beaux-Arts, the Hôtel de Cluny and the Conservatoire des Arts et Métiers. Monuments of great beauty and artistic design are found everywhere throughout the city. In the very center is the famous obelisk of Luxor, 76 ft. high, covered over with hieroglyphics and brought to France from Egypt in 1836. The Arc de Triomphe du Carousel, the bronze statue of the Republic, Napoleon's column of victory, the Triumph of the Republic and the Arc de Triomphe de l'Étoile are other features.

POPULATION. In 1911 the population of Paris was 2,888,110. Both the birth rate and the death rate are low, and the city is preeminently a town of adults. About eight per cent constitutes the foreign population, principally Italians, Swiss, Belgians, Germans, Russians, English, Americans, Spaniards, Dutch and Austrians. The bulk of the population is Roman Catholic; there are about 90,000 Protestants and 50,000 Jews.

COMMUNICATION AND COMMERCE. Electric tramways and omnibuses furnish the chief means of communication, and the cab system of the city is unexcelled. The electric railways are largely underground and over 35 m. are in operation. So efficient is the supervision of the traffic on the streets that, although it exceeds in density and amount that of any other city, they rarely give the appearance of being crowded and there is seldom a "block," but a continuous and uninterrupted stream gives a constant air of gayety to this, the most aristocratic and brilliant city in the world. The steamboats of the Seine are used to a large extent when the weather is favorable. All the principal railway systems of the country (except the Midi) have terminal stations in Paris, and the large stations are the Quai d'Austerlitz and the Gare Montparnasse. The total mileage of thoroughfares exceed 600, which are maintained at an annual cost of $2,500,000.

INDUSTRIES AND COMMERCE. Paris represents the industrial center of the country, but it is only within recent years that there has been a manifest tendency to the erection of large establishments. The products are brought out in small workshops and are distinguished for their elegance and artistic beauty. Printing, the manufacture of railroad supplies, chemical products, machinery, porcelain, leather, china, etc., are carried on in large factories, but for the production of clothing, furniture, gold, silver and aluminum ware, gloves and articles of luxury, the small workshop still holds its own, and in these products Paris surpasses the efforts of the rest of the world.

The annual trade of Paris is estimated at $600,000,000 in the products of its industry. The great financial institutions are the Bank of France and the three private banks, the Comptoir National d'Escompte, the Crédit Lyonnais and the Société Générale, the three last named having an aggregate capital of over $170,000,000. The city has always ready cash in abundance, and this, together with the stable bank rate, causes a prevalence of cheap money at all times. The Bourse, the stock exchange of the city, has only 70 memberships, which, due to their limited number, are inevitably very valuable, and the amount of business transacted there annually is estimated at about $20,000,000,000.

GOVERNMENT. For the purpose of administration the city is divided into 20 arrondissements, and four members from each arrondissement, elected by the people, constitute the municipal council, of which the prefect of the Seine is the head. Each arrondissement represents a unit of municipal administration and attends to the assessment and collection of taxes, keeps the registration lists of jurors and voters, administers the schools and libraries and different forms of charity work and receives and files the various applications for privileges and licenses. An efficient system of civil service aids the municipal government by its adequate control of the appointments and promotions of officials. A service of sanitary police enforces the health laws, and the sanitary conditions of dwellings are passed upon at regular intervals.

HISTORY. Paris is described in the *Commentaries* of Cæsar (under the name of Lutetia) as a collection of mud huts occupied by a Gallic tribe conquered by the Romans. St. Denis introduced Christianity in A. D. 250. In the fourth century the name was changed to Parisia, or Paris, and 200 years later Clovis chose it as his seat of government. The invasions of the Northmen caused heavy losses, but after the tenth century when

Hugh Capet, the founder of the Capetian dynasty, made it his residence, the city grew rapidly in numbers and importance. In 1589, when Henry of Navarre came to the throne, many improvements were begun, which reached their culmination under Louis XIV, to whom the city owes in large part its prestige as the center of European civilization. Following the reaction caused by the French Revolution came the further construction under Napoleon of buildings on a more magnificent scale than ever before, and during 12 subsequent years he lavished a vast sum of money on beautifying the city. The siege of Paris in 1870-71 wrought great damage, and the fire caused ravages of buildings which in beauty and worth can never be replaced.

Paris, Tex., a city and the county seat of Lamar Co., about 93 m. n.e. of Dallas, on the St. Louis & San Francisco, the Texas & Midland, the Texas & Pacific, the Gulf, Colorado & Santa Fe and other railroads. The agricultural lands surrounding the city are noted for their productivity; cotton, fruits, vegetables, corn, oats and alfalfa are grown in large quantities. There are flour mills, cotton gins, large cottonseed-oil mills, cotton compresses, candy factories, a handle and crate factory, a canning plant, mattress and broom factories, woodworking shops and an iron foundry. Paris also contains a number of handsome buildings and noteworthy institutions. Among the former are a Federal Building, post office and county courthouse; while the latter includes a public library, hospital, Y. M. C. A. and schools. Paris was settled in 1841 and is governed under a charter of 1905. Population in 1920, 15,040.

Paris, Treaties of, the name given to important treaties of peace concluded at Paris, France, in 1763, 1783, 1814, 1815, 1856 and 1898.

The Treaty of Feb. 10, 1763, was concluded between Spain and France and Great Britain and Portugal, at the end of the Seven Years' War. By this treaty the political condition of America was altered. France ceded to Great Britain all her possessions east of the Mississippi, including Canada, Newfoundland and Cape Breton Island, except the island on which New Orleans is situated and two islands in the Gulf of St. Lawrence. To Spain was ceded the Province of Louisiana west of the Mississippi and the Island of Orleans. England returned Havana to Spain but received Florida in exchange. See FRENCH AND INDIAN WARS, subhead *French and Indian War.*

The Treaty of Sept. 3, 1783, between Great Britain and the United States, marked the close of the American Revolution and recognized the independence of the colonies. The Mississippi River was also recognized as the western boundary from a point west of the Lake of the Woods (See NORTHWEST TERRITORY). With regard to the fisheries it was provided that the Americans were to have the same rights which they had enjoyed as English colonists. See FISHERIES QUESTION; REVOLUTIONARY WAR IN AMERICA.

The Treaty of May 30, 1814, was concluded between France and the representatives of all the great powers of Europe. It provided that France should surrender all her conquests except slight territories on the northern and eastern boundaries, but no indemnity was required. Most of the colonies taken from her by Great Britain were restored, and Switzerland was declared independent.

The Treaty of Nov. 29, 1815, modified the Treaty of 1814. France was compelled to pay indemnities to the allied powers and consent to the occupation of her frontier by a large army for a period of five years, defraying the cost out of her revenues.

The Treaty of March 30, 1856, was concluded at the close of the Crimean War, and several important principles of international law were agreed upon and embodied in the Declaration of Paris. See CRIMEAN WAR.

The Treaty of December, 1898, terminated the Spanish-American War. By its terms Spain relinquished Cuba and

ceded the Philippine Islands, Guam and Porto Rico to the United States, receiving therefor the sum of $20,000,000. See SPANISH-AMERICAN WAR.

Treaty of 1919, closing the World War. See VERSAILLES, TREATY OF.

Paris, University of, at Paris, France (1200). This is one of the oldest and largest universities of the world. It developed naturally from a group of schools that became prominent during the latter part of the 12th century, and its organization became the model for numerous universities since established. In the 14th and 15th centuries it seems to have been the educational center of Europe and of the Christian world. A loss of prestige resulted from the development of other great universities, and from the political dissensions which had their culmination in the French Revolution.

Today it is one of the leading universities of Europe, with a very large student body, and a library of about 1,000,000 books and manuscripts.

Park, Mungo (1771-1806), an African traveler, born of Scotch parents near Selkirk, Scotland. He was educated at Edinburgh for a surgeon, but yielded to the desire for travel and sailed from England in 1795 under the employ of the African Association. During his first expedition he was imprisoned by a Moorish king, but finally escaped, returned to Scotland and wrote *Travels in the Interior of Africa.* In 1805 he undertook an expedition for the government and lost his life while exploring the Niger River. His writings were popular and widely read.

Par'ker, Francis Wayland (1837-1902), an American educator who did much for the common schools of the country, born at Bedford, N. H. He taught in New Hampshire both before and after the Civil War, during which he served in the Union army and won the rank of colonel. As superintendent of schools at Quincy, Mass., he gained a national reputation by his opposition to formalism and routine methods. He was supervisor of schools in Boston; and, after 1883, was for 13 years principal of the Cook County (now the Chicago) Normal School; was president of Chicago Institute; and, at his death, was director of the School of Education of the University of Chicago. He contributed to many educational periodicals. Among his books are *The Practical Teacher, Talks on Teaching* and *How to Study Geography.*

Parker, Sir Gilbert (1862-), a Canadian novelist, born at Camden East, Addington, Ontario. He studied at Ottawa and at Trinity University, Toronto, and in 1885 went to Australia for his health. After serving as associate-editor of the Sydney *Morning Herald,* he later traveled in northern Canada. He took up his residence in London in 1897, and began to write fiction with great success. In 1900 he was elected to Parliament as Conservative member for Gravesend, and was reelected in 1906. He was knighted in 1902. He worked zealously for tariff reform and imperial preference, and his enthusiastic support of the cause of the Imperialists won for him a prominent place in the Unionist Party. His chief claim to distinction as a novelist rests on his admirable descriptive and dramatic Canadian stories, among which are *Pierre and His People, Mrs. Falchion, The Trail of the Sword, An Adventurer of the North, The Seats of the Mighty* and *The Lane That Had No Turning.* Other novels include *The Battle of the Strong, The Right of Way, Donovan Pasha, The Weavers* and *Northern Lights.*

Parker, Theodore (1810-1860), an American divine, born in Lexington, Mass. In 1830 he entered Harvard, but did not graduate, and, having taught school until 1837, he then settled as a Unitarian preacher at West Roxbury. Despite the fact that his views were considered heterodox, he soon became one of the most famous preachers of his time. In 1843 he visited England, France, Italy and Germany, and three years later he settled as a minister in Boston. Subsequently his eloquence was directed against the Mexican War and

slavery and in behalf of temperance. Ill health terminated his public career in 1859, and having first visited Santa Cruz and then Europe in the hope of recovery, he died in Florence. He bequeathed 13,000 valuable books to the Boston Public Library. His publications include *A Discourse of Matters Pertaining to Religion;* and *Sermons of Theism, Atheism, and the Popular Theology.*

Par'kersburg, W. Va., a city and the county seat of Wood Co., 94 m. s.w. of Wheeling, on the Ohio River, at the mouth of the Little Kanawha River, and on the Baltimore & Ohio, the Baltimore & Ohio Southwestern, the Little Kanawha and other railroads. An electric railway connects with Marietta, Ohio; and passenger and freight transportation is provided by steamboat lines touching Pittsburgh, Cincinnati and other river points. An agricultural region lies about the city, and deposits of petroleum, coal and clay abound. There are numerous gas wells and valuable medicinal springs. Industrially, the city is of considerable importance, containing machine shops, iron foundries, oil-well supply works, oil refineries, flour mills, lumber mills, furniture factories, panel and veneer works. Coal, farm products and manufactured articles form the basis of a considerable trade.

Parkersburg has a number of important institutions and structural attractions. The two bridges, one across the Little Kanawha, and one spanning the Ohio, the latter constructed at a cost of $1,000,000, are both examples of excellent engineering skill. The Federal Building, city hall and courthouse are prominent buildings, and Washington High School and the Academy of the Visitation are notable. Other prominent features are a public library, a public park and Blennerhassett Island, not far distant. Settled in 1773, Parkersburg was incorporated in 1820 and is now administered under a revised charter of 1903. Population in 1920, 20,050.

Par'kin, George Robert (1846-), a Canadian author and educator, born in New Brunswick and educated at New Brunswick and Oxford universities. Having entered the teaching profession, he was principal of College School, Fredericton, New Brunswick, for 15 years, and principal of Upper Canada College, Toronto, from 1895 to 1902, in which latter year he became organizing representative of the Rhodes Scholarship Trust. Previously, in 1889, he toured the Canadian and Australian colonies in the interest of imperial unity. The writings of Dr. Parkin include *Round the Empire, Geographical Unity of the Empire* and *Life of Sir John A. Macdonald.*

Park'hurst, Charles Henry (1842-), an American clergyman, born in Massachusetts. He was educated at Amherst College and at the universities of Halle and Leipsic. After returning from his studies abroad, he became pastor at Lenox, Mass. In 1880 he moved to New York City and became pastor of Madison Square Presbyterian Church. Dr. Parkhurst was elected president of the Society for the Prevention of Crime, and was largely instrumental in inaugurating the investigations which resulted in the appointment by the Senate in 1894 of the committee to inquire into the police regulations and management of the city. The committee sustained the charges preferred by the Society for the Prevention of Crime. Dr. Parkhurst has published *The Blind Man's Creed* and *Our Fight with Tammany.*

Park'man, Francis (1823-1893), an American historian, born in Boston, Mass. He graduated from Harvard in 1844, studied, but never practiced, law, and soon determined to devote himself wholly to historical researches in connection with the rise, decline and fall of the French power in America. In preparation for this task he studied the Indian tribes of New York, New England and southern Canada, and later lived in the Black Hills of the Dakotas and in the Rocky Mountains. He related his experiences in connection with this expedition in his well-known book, *California and the Oregon Trail.* Many hardships endured on this trip affected his health per-

manently, but he continued his investigations both in his own country and in Europe (he visited Europe seven times), and published several important books. His eyesight gradually failed him until dictation and hearing others read to him were his only resort, and the struggle which followed was as heroic as any ever before or since endured by a man of letters.

In his works he combined the two qualities which make for enduring fame —the accuracy and indefatigability of a painstaking investigator and the consummate skill of an artist. His intimate knowledge of the wild life of the Indian has practically remained unsurpassed. Among his works are *The Conspiracy of Pontiac, Pioneers of France in the New World, The Jesuits in North America, La Salle and the Discovery of the Great West, Montcalm and Wolfe, A Half-Century of Conflict* and *Historic Handbook of the Northern Tour.*

Parliament, *Par' li ment,* the supreme legislative body of the United Kingdom of Great Britain and Ireland. Parliament is summoned by the writ of the sovereign issued out of Chancery, by the advice of the Privy Council, at least 35 days before its assembling. The annual session extends from the middle of February to about the end of August, or sometimes to the late autumn. Every session must end with a prorogation, and by it all bills which have not been passed during the session then lapse. A dissolution may be brought about by the will of the sovereign; or during the recess, by proclamation; or finally by lapse of time, the statutory limit of the duration of the existence of any Parliament being five years.

Parliament is divided into the House of Lords and the House of Commons. The House of Lords consists of the following: peers who hold their seats—(1) by hereditary right; (2) by creation of the sovereign; (3) by virtue of office—English bishops; (4) by election for life —Irish peers; (5) by election for duration of Parliament — Scottish peers. There are, besides, 14 peeresses of the United Kingdom in their own right, and three Scottish peeresses, and 19 Scottish and 65 Irish peers who are not peers of Parliament. The House of Commons consists of members representing county, borough and university constituencies in the three divisions of the United Kingdom. No one under 21 years of age can hold a seat in Parliament. Clergymen of the Church of England, ministers of the Church of Scotland, and Roman Catholic clergymen are disqualified from holding seats, as are all government contractors, all sheriffs and all returning officers of the localities for which they act. No English or Scottish peer can be elected to the House of Commons, but non-representative Irish peers are eligible. In August, 1911, it was provided by resolution of the House of Commons that a yearly salary of £400 a year be paid to the members of the House of Commons, other than those already drawing salaries as officers of the house. This provision was not extended to the House of Lords.

Formerly the House of Lords possessed the right to veto a bill passed by the House of Commons, and the only recourse for the government was an appeal to the country in a general election. If the electorate sustained the government, the lords were compelled to yield. Otherwise the ministry resigned. In August, 1911, a bill was passed which deprived the upper house of this form of veto. This bill provided: "If any public bill (other than a money bill or a bill containing any provision to extend the maximum duration of Parliament beyond five years) is passed by the House of Commons in three successive sessions (whether of the same Parliament or not), and, having been sent up to the House of Lords at least one month before the end of the session, is rejected by the House of Lords in each of these sessions, that bill, shall, on its rejection for the third time by the House of Lords, unless the House of Commons direct to the contrary, be presented to His Majesty and become an act of Parliament on the royal assent being signified thereto, notwithstanding that the House of Lords

have not consented to the bill: Provided that this provision shall not take effect unless two years have elapsed between the date of the second reading in the first of those sessions of the bill in the House of Commons and the date on which it passes the House of Commons in the third of those sessions."

The English Parliament grew out of the Anglo-Saxon Assembly. As early as the Norman kings it began to do its work in large committees. In the reign of Edward III, during the 14th century, Parliament was divided into two houses. In 1707 the Parliament of Scotland was united with that of England, and in 1800 there was a Parliamentary union with Ireland. Reform bills both for voting and representation were passed in 1832, 1867 and again in 1884, at which time the basis of the present franchise was laid. Parliament meets in an edifice known as the House of Parliament, in Westminster. Its legislative authority extends over the United Kingdom and all its possessions.

Parliamentary Law, those rules by which most deliberate assemblies agree to be governed. In its original application it referred to the usages governing the proceedings of the English Parliament; today the term includes all rules, precedents, customs and usages which have been generally accepted as most practicable in controlling deliberative bodies. In the United States no single compilation is accepted as a universal authority; the rules of Congress have great weight, yet every state Legislature compiles the rules under which its deliberations shall proceed.

The first principles of parliamentary law are that all business must be brought before the assembly through a motion or resolution, and that only one person has the right to speak at one time. The presiding officer recognizes the one who rises first, though it is within his discretion to recognize any other for special reasons. It is customary to require a second to every important motion in order to show that it has the support of more than one member. The motion is then stated by the chairman, and the maker of the motion is entitled to speak in its behalf. General discussion then follows and the rule is that no other question can be considered while the first question is under debate. An amendment may be offered and this must be disposed of before a vote is taken on the regular motion. If the amendment is adopted, the motion as amended takes the place of the original motion. An amendment to the amendment can also be offered, and if presented must be acted upon before taking a vote upon the original amendment. A substitute motion must pertain to the same question as the motion before the house. Its purpose is to dispose of the subject under consideration in another way. It takes precedence over the original or amended motion.

There are certain classes of motions, however, which takes precedence of all others. The first class, called subsidiary motions, are used to suppress or postpone the discussion of a question. Among these is the motion to lay on the table, that is, to postpone action until the measure can be taken up by consent of the assembly. This motion cannot be debated. The second subsidiary motion is the request of the previous question, which stops all debate and orders the question submitted to a vote. The motion for the previous question requires two-thirds for its adoption. There are also motions to commit, that is, refer to a committee; to postpone to a certain time; and to postpone indefinitely. There are also incidental questions of appeal, objection and suspension of the rules, all of which must be disposed of immediately upon their introduction. Finally there are so-called privileged questions including motions to adjourn or determine rights of the assembly. Voting is by voice, those favoring a motion saying "aye," those opposing it saying "no," by a rising vote or by ballot.

Parnas'sus, in Phocis, the highest mountain in central Greece, being 8070 ft. above sea level. One of its two "heads" was sacred to Bacchus; the

other, to Apollo and the Muses. Delphi, the Castalian spring and the Corycian cave were all on its southern slope.

Par'nell, Charles Stewart (1846-1891), an Irish leader for Home Rule. He entered Parliament for Meath County in 1875 and soon revealed his power in leadership and his skill in the use of Parliamentary tactics. He was successful in bringing the question of Home Rule for Ireland before Parliament, and in the advocacy of this measure received the support of the Irish dwelling in other countries, as well as in Ireland. By 1880 he had become the leader of his party. In 1886 he was influential in securing the victory of the Liberals, and the appointment of Gladstone as premier. However, his Home Rule bill was defeated. Shortly before his death he suffered a loss of reputation and political power.

Parole', in military affairs, the release of an officer or soldier from confinement on his word of honor. The most extensive use of the parole is in releasing prisoners of war, who are allowed to return to their homes on their promise not to reenter the ranks during the war or until exchanged. If this word is broken and the person is captured a second time he is liable to be sentenced to death. In some states the parole system is employed to release convicts from penitentiaries on trial. The state usually requires someone to be responsible for the convict paroled and to agree to furnish him with steady employment for a specified time. If the convict is orderly and industrious for a certain number of months, the parole is followed by a pardon; but if he becomes lawless, he is returned to prison.

Pa'ros, Island of, an island of the Grecian Archipelago of the group known as the Cyclades. It is one of the largest islands of the group, having an area of 96 sq. m. The famed Parian marble is secured from this island and is quarried chiefly upon the rugged slopes of Mount St. Elias, anciently known as Marpessa (See MARBLE). Grains and fruits are grown and wine and oils are exported. Population, about 8000.

Parr, Catharine (1512-1548), the sixth wife of Henry VIII, was the daughter of Sir Thomas Parr. She had twice been left a widow when, in July, 1543, she married Henry. She acted kindly towards her stepchildren, and persuaded Henry to restore to his daughters the right of succession. Distinguished for her learning and her knowledge of religious subjects, she was accused of heresy, but the King would not permit her arrest. After Henry's death she married Sir Thomas Seymour.

Par'rakeet, or **Paroquet,** *Par' o ket,* a name given to many of the small parrots with long, wedge-shaped tails and green plumage. The grass parrakeets, confined to Australia and Tasmania, are good examples of this group. They are more terrestrial in their habits than is usual in parrots, spending much time in grasses and reeds, feeding on seeds. The elegant grass parrakeet is one of the best known. It is about nine inches long; the upper parts are greenish-blue; the under parts, yellowish-green; and the abdomen, bright yellow. There is a deep blue bar on the forehead and a yellow patch near the eye. This parrakeet is found in large flocks.

Par'rish, Randall (1858-), an American journalist and novelist, born in Illinois. After studying at the University of Iowa he was admitted to the bar and began the practice of law. In 1883-5 he engaged in prospecting in Arizona and New Mexico, later doing newspaper work in Denver, Omaha, Sioux City and Chicago, and acting as manager of country papers in Nebraska and Illinois. More recently he has been engaged in special commercial journalism in Chicago. He has been writing fiction since 1904. Among his popular novels are *When Wilderness was King, Prisoners of Chance, Keith of the Border, My Lady of Doubt* and *Molly McDonald.* He has also written a history of Illinois.

Par'rot, a name applied to a group of birds having strong, hooked bills, short legs with rough feet, with the hind toe turned backward. In size they range

from a small species about the size of a sparrow to the great macaws, which measure over three feet in length. The colors are usually gaudy, green predominating, but reds, blues and yellows are common. They are typically birds of the tropics, only a very few species being found in the temperate zones. No species is found in Europe, and but a few species occur in Asia and Africa. They nest in hollow trees and feed on seeds and fruit.

Of the 360 known species, about one-half are found in South America and a large number in Australia, where the most brightly colored species, called lories, are found. Several species of parrots are tamed and they can be taught to speak. Some have considerable intelligence, the yellow-headed Mexican parrot being one of the brightest. They are mischievous and often play laughable pranks.

Par'sees, the modern adherents of Zoroastrianism, the religion of ancient Persia prior to the introduction of Mohammedanism. After the Arabian invasion of the seventh century, when Persia was won over to the Islam faith, a large number of Zoroastrians left their country to gain greater religious freedom, moving to the city of Ormuz, on the Persian Gulf. Later they emigrated again, finally settling among the Hindus to the north of the modern Bombay. In 775 they were joined by a second band, and the community thus established flourished until 1315, when the Mohammedans invaded India. The Parsees sought refuge in the Bharhut hills and there preserved their ancient ceremonies. In the 16th and 17th centuries they spread widely through Gujarat and settled in various places. In 1901 there were 94,000 Parsees in India, all but 7000 of whom were settled in the Bombay Presidency and the adjoining State of Baroda; the rest were scattered as traders in the large towns. These people are remarkably liberal, thrifty, intelligent and progressive. They have in general remained faithful to the ancient teachings of Zoroaster, but some changes have crept into their customs. They are frequently designated "fire worshipers," a name which they consider a misnomer, as they regard fire as merely one of the emblems of the power of the good spirit Ormazd. See ZOROASTRIANISM.

Par'sifal, a music drama by Richard Wagner, first presented in Baireuth in 1882. The story is based on the King Arthur legend of Perceval and the Holy Grail and on the *Parzival* of Wolfram von Eschenbach (about 1205), but Wagner somewhat modified the original tale. The main characters are: Parsifal; Amfortas, a knight of the Grail who has fallen into the power of Klingsor, a hostile magician; and Kundry, one of the beautiful women through whom Klingsor hopes to gain authority over the knights by tempting them to break their vows of chastity. Amfortas has been wounded by the Holy Spear, which has fallen into Klingsor's possession. The scene is laid at Monsalvat, Spain, in or near the Castle of the Grail. Parsifal is forced by the knights to leave the castle, because of his indifference to the Grail. Withstanding the efforts of both Klingsor and Kundry to overcome him, Parsifal recovers the Holy Spear, then starts out in search of the Holy Grail, the value of which he now recognizes. After many years he meets Kundry, now repentant, and one of the knights, who leads him to the castle. Here he heals the wound of Amfortas by touching it with the Holy Spear. Kundry dies in happiness, after being baptized, and Parsifal is proclaimed king by the knights of the Grail.

Pars'ley, a plant of the Parsley Family, or order Umbelliferæ. The common parsley is a native of Europe, but is quite generally cultivated in gardens in the United States and used for seasoning and for table decorations. It has a smooth stem and curled or plain leaves. The variety with the curled leaves is usually preferred. Hamburg parsley has a large white root which is eaten much the same as the carrot and parsnip.

Pars'nip, a garden vegetable of the Parsley Family, raised for its sweet,

fleshy root. Cultivated, the roots are pleasing to the taste and are widely served fried or cooked with milk. They are generally of better flavor if left in the ground over winter. The stem is high and bears numerous downy leaves made up of several leaflets. The flowers are small and yellow, but grow in large, flat-topped clusters. In many localities the parsnip has run wild and become a troublesome weed; in that state its root is tough and flavorless and its stem coarse and unsightly. Other allied species, found in the woodland adding to its summer beauty, are the cow parsnip, wild parsnip and meadow parsnip. They are to be distinguished chiefly by their seeds and by the shape of their leaves. Cowbane, a very similar species, is a plant exceedingly poisonous if eaten.

Par'sons, Kan., a city of Labette Co., about 137 m. s.w. of Kansas City, at the junction of the Big and the Little Labette creeks, and on the Missouri, Kansas & Texas, the Kansas City, Ft. Scott & Memphis and other railroads. There is natural gas here, which is used for light and heat. Among the industries are the manufacturing of farming tools, flour, feed and ice. In the town are grain elevators, machine shops and a foundry. Parsons is the seat of the Kansas State Hospital for the Insane, and has, among other attractive features, two parks, well-kept streets, a Masonic Temple, a Y. M. C. A. Building and a good railway station. The place was first settled in 1869 and called Mendota. In 1891 the city was granted a charter and since 1910 has been administered under the commission form of government. Population in 1920, 16,028.

Parson's Cause, a celebrated lawsuit, through which, in 1763, Patrick Henry was first brought into public notice as an orator. Tobacco was legal currency in Virginia and, according to an old statute, Episcopal clergymen received annually 16,000 pounds of tobacco for a salary. As a result, however, of the French and Indian War, the *Optional,* or *Twopence,* law was passed in 1758, allowing the salaries of the clergy to be paid in paper currency instead of tobacco, at the rate of twopence a pound. When tobacco went up to sixpence a pound the loss to the clergymen was considerable, and their protests reached the Bishop of London, through whose instrumentality the statute was vetoed by the King in council as unconstitutional. Several clergymen then sued for back pay, and in the test case of Rev. James Maury, the court decided in his favor, the damages to be settled by jury. As counsel for the defendant colony, Patrick Henry then made his eloquent speech, in which he asserted that Virginia could legislate for herself in affairs of internal concern and that by his interference the King had degenerated from a father to a tyrant. Despite cries of "Treason!" the court awarded one penny in damages.

Parthenon, *Pahr' the non,* **The.** See ATHENS, subhead *Age of Pericles.*

Part'nership, an association or firm voluntarily formed, but not incorporated, by two or more competent persons to establish and carry on for profit any business or trade not unlawful. Between partners a contract exists by implication, oral agreement or in written form; and this may be for an indefinite or for a limited period. It may be terminated by mutual consent or by one member, even against the wish of the others, in which case he becomes liable for such damages as may be awarded for his breach of contract; or its dissolution may be ordered by a court under certain conditions. One is a nominal partner who allows his name to be used, though not sharing in the firm's profits; a silent partner, if his interest in the firm is kept secret and he takes no active part in its management; while the real, ostensible or active partner is one who participates in promoting the business. Under the statutes of some states, limited partnerships may be organized (See JOINT-STOCK COMPANY). In partnerships each member is a general agent for the firm, and may bind his partners for the fulfillment of obligations, sell firm property and collect debts due to the firm. See CORPORATION; CONTRACT; AGENT.

Par'ton, James (1822-1891), an American biographer, born in Canterbury, England. Brought to the United States in 1827, he was educated in New York City and at White Plains, N. Y., taught school and began his literary career as a journalist. After the publication of his successful *Life of Horace Greeley* in 1855, he devoted his time to writing and to lecturing on political and literary topics. His works include *Life and Times of Aaron Burr, Life of Andrew Jackson, Life and Times of Benjamin Franklin, Famous Americans of Recent Times, The Words of Washington, Life of Thomas Jefferson, Noted Women of Europe and America, A Life of Voltaire, Caricature and Other Comic Art in All Times and Many Lands* and *Captains of Industry.*

Par'tridge, birds of the Grouse Family. Of the seven species and races of partridge found in western North America, the California partridge is perhaps the best known. It is about the size of the robin. The upper parts are deep brownish, with buff stripes running along the sides; the back of the head has a dark olive patch bordered by black and white lines; the flanks are brownish, streaked with white; the under parts are so colored as to appear to be covered with scales, with the exception of a central chestnut patch; the breast is gray; and the throat is black, bordered with white. The head supports a black crest. The nest is made in a hollow on the ground under some shelter and is lined with grass; it contains 12 to 16 buff-spotted eggs. This partridge lives in large flocks and is the common game bird of western America. Its cheerful note, which seems to say "who-are-you-ah," may be heard in almost any California valley. See RUFFED GROUSE.

Partridge, William Ordway (1861-), a distinguished American sculptor, born in Paris and educated at Columbia University and in Paris and Rome. He has written several books on art subjects, and has produced many notable pieces of sculpture, among them portrait busts; a statue of Shakespeare, in Lincoln Park, Chicago; a statue known as *An Old Woman,* in the Corcoran Gallery, Washington, D. C.; and the *Kauffman Memorial* in the same city.

Pasadena, Cal., a city of Los Angeles Co., 9 m. n.e. of Los Angeles and 20 m. e. of the Pacific Ocean, on the Atchison, Topeka & Santa Fe, the Southern Pacific and the San Pedro, Los Angeles & Salt Lake railroads. The city has an altitude of from 800 to 1100 ft. and is situated about 4 m. from the foot of the Sierra Madre Mountains. Pasadena covers an area of over 11 sq. m. and is known as one of the most beautiful cities in the southern part of California. Its climate is world-renowned. The streets are wide and profusely shaded with graceful peppers, grevilleas, magnolia, palm, acacia and other semitropical trees. It is the center of 307 m. of good roads, making accessible every day in the year practically all the popular resorts, both those on the seashore and those in the mountains. The electric railways connect with an extensive system of electric roads, making accessible over 100 cities and towns of the San Gabriel Valley. Los Angeles is reached by three electric lines, and from Rubio Canyon, near the city, there is a steep cable railway to Echo Mountain, connecting with an electric line to Mt. Lowe. On Echo Mountain is located the famous Lowe Observatory. The solar observatory of the Carnegie Institution of Washington, D. C., is located on Mt. Wilson not far from the city. The celebrated Busch Gardens are notable achievements in the art of landscape gardening.

Pasadena ranks high among the tourist resort cities, and there are many palatial hotels, which include the Green, the Maryland, the Huntington and the Raymond. These hotels are famed for their costly equipment. Other public buildings include a Federal Building, costing $300,000; a public library of the Romanesque style of architecture; Y. M. C. A. and Y. W. C. A. buildings, numerous handsome churches, about 11 banks and many handsome office buildings. Bungalows of the Spanish type are a favorite

style of residence, and nowhere will be seen such beautiful and varied types of architecture. Pasadena is the seat of Throop College of Technology, an engineering college. Other educational institutions include the Polytechnic High School, costing $500,000; several private schools; and public and parochial schools. The Tournament of Roses, a flower carnival, is held each year on New Year's Day.

The cultivation of oranges, lemons, grapefruit, figs, peaches and other varieties of fruit forms the chief industry of the surrounding region. The city contains large packing houses and fruit-drying establishments and manufactories of boots and shoes, brick and lumber products. The sale of town lots began in 1882, and four years later a city charter was granted. Population in 1920, 45,354, an increase of 49 per cent in the decade from 1910 to 1920.

Pascal, *Pas' kal,* **Blaise** (1623-1662), a French religious philosopher and mathematician, born at Clermont-Ferrand and educated in Paris by his father. At an early age he showed a remarkable aptitude for mathematics, and when he was 16 he had completed a work on conic sections, which laid the foundation for modern treatment of that subject. At the age of 27 he joined the Jansenists, and from that time devoted much of his attention to religious writings. He entered the controversy between the Jansenists and the Jesuits and published a series of letters under an assumed name, in which he vigorously attacked the Jesuit Order. Later the letters were collected and published under the title *Les provinciales.* They were very popular and are considered the greatest masterpiece in the literature of irony.

Notwithstanding his eminence as an essayist on religious topics, Pascal is more widely known at the present time for his researches in mathematics and physics. He was the first one to attempt a philosophy of mathematics. In addition to his work on conic sections he distinguished himself by his skill in infinitesimal calculus, and as the founder of the mathematical theory of probabilities. In physics his experiments on the equilibrium of fluids make him one of the founders of the science of hydrodynamics. He was also the first to show by experiment that the pressure of the atmosphere decreases with an increase of altitude, thus demonstrating the principle upon which the barometer is constructed.

Passaic, *Pa sa' ik,* **N. J.,** a city of Passaic Co., 10 m. n.w. of New York and 5 m. s.e. of Paterson, on the Passaic River and on the Erie, the Delaware, Lackawanna & Western, the New York, Susquehanna & Western and other railroads. Passaic is noted as a manufacturing city. The east part of Passaic is occupied chiefly by factories, for which abundant water power is furnished by means of canals and the river, which is navigable for small vessels to this place. The west part of the city extends over rising hills which command beautiful views, and is almost wholly residential. Passaic has many miles of paved and shaded streets and beautiful drives over good roads extending in all directions. Electric lines extend to Paterson, Jersey City, Newark and all the neighboring suburbs. There are five parks, one of which surrounds the city hall near the center of the city. The largest park, consisting of 100 acres, has been purchased in the west side of the city.

The educational institutions include a Collegiate School and two libraries, including the Jane Watson Reid Memorial Library. The new high-school building is the finest edifice in the city. There are good municipal buildings and many handsome churches. The chief industrial establishments include large textile and woolen mills, rubber works, print works, enameline factories, submarine-cable works, cotton and worsted mills, steel works, chemical works, handkerchief factories and manufactories of soap, matches and pantasote leather. Large vineyards surround the city and wine making is an important industry.

Passaic was settled about 1692 by the Dutch and was called Aquackanonk Landing until 1852. In November, 1776,

Washington retreating through New Jersey crossed the Passaic River at this point. The city is located near the place of several skirmishes of the Revolutionary War. Passaic was incorporated as a village in 1869 and in 1873 received a city charter. Population in 1920, 63,841.

Pas'senger Pigeon, *Pij' un,* a bird of the Pigeon Family. It is longer than the domestic pigeon (about 17 inches). The male has brown back and wings, the latter spotted with black, and pinkish brown under parts changing to white on the abdomen. The head and neck are bluish-gray and the nape and sides of the head are metallic red or purple; the middle feathers of the tail are blackish, changing to white and black, with red and black spots on the outer feathers. The female is slightly smaller and the under parts are brownish and the metallic colors less distinct. The nest is placed in a large tree and is loosely made of sticks. One or two white eggs are laid.

The passenger pigeon once ranged from northern British America to Texas, and flocks were so large as to darken the sun. It has been exterminated by persistent hunting.

Passion, *Pash'un,* Flower, an interesting herb or low shrub of the Passion Flower Family, named by Roman Catholic missionaries in South America. Its name refers to the odd shape of the flower, which is supposed to symbolize the passion of Christ. The receptacle of the flower, upon which the parts of the flower are borne, is lengthened, and upon it, in the center, is the pistil, whose three or four round-topped divisions, 2 in Fig. 1, represent the nails of the cross. On each side the five stamens, 1 in Fig. 1, or slender projections with hammerlike heads, represent the hammers which drove the nails; the fringe of petals, 3 in Fig. 1, the crown of thorns; and the tendrils, shown in Fig. 2, the cords with which Christ was bound.

The wild passion flowers grow from Pennsylvania south, and bloom all summer, though the flowers last but a day. They are low herbs with three-lobed leaves and greenish-yellow flowers in one species, and large purple flowers in another. The cultivated species are rather woody, and one variety, the quadrangular passion flower, or large granadilla, has square stems, undivided leaves and bell-shaped flowers. The flowers of those

PASSION FLOWER

in cultivation are purple, sometimes white-streaked. The fruit in all species is large and juicy, and is called maypops by the children, who gather them to eat.

Pas'sion Play, a form of mystery play acted in Holy Week in medieval times, founded on incidents of the Bible. These plays were common in Provence, northern France, Italy and England. Later they fell into disfavor. In 1633 the inhabitants of Oberammergau, a little village of Bavaria, vowed that they would perform a passion play every tenth year as a token of their gratitude for having escaped a contagion that was causing great desolation. The play has since then been performed in accordance with the vow and always attracts thousands of visitors from all over the world. The performers, who are residents of the village, enter into their duties with the greatest reverence and earnestness.

The effect of this play on the people of Oberammergau is said to be remarkable: the boys consider it their highest aim to live so as to be worthy some day of taking the part of Christ in the play; the girls, to be worthy of impersonating Mary, the mother of Christ.

Pass'over, one of the three great Jewish feasts, the others being the Pentecost and Feast of Tabernacles. The Passover is traditionally connected with the deliverance of the Children of Israel from bondage, referring especially to the time when the angel of the Lord smote the first-born of the Egyptians, but *passed over* the houses that were sprinkled with blood. It seems probable, however, that the Passover gradually developed into an elaborate ceremonial, and that it was originally a combination of an old Canaanitish harvest festival and a festival in which the chief rite was the sacrifice of a sheep and the sprinkling of the doorposts of the houses with blood. The association of the feast with the deliverance from bondage became so emphasized that in due time the Passover lost its original significance. The celebration of the feast begins on the evening of the 14th day of Nisan and lasts for eight days. During this time unleavened cakes are eaten and no food having any leaven material is partaken of. In Bible times the Passover was celebrated at Jerusalem; this festival was the greatest event of the year, making necessary the erection of tents to accommodate the multitudes who journeyed to the Holy City to observe the feast. Like the American Thanksgiving, the Passover is now celebrated in Jewish homes.

Passport, an official document issued to a person by his home government, certifying to his citizenship and requesting foreign powers to grant him safe and free passage and all lawful protection while within their jurisdiction. The application must be accompanied by a description of the person, particularly as to age, height, complexion, eyes, etc., and there must also be an affidavit, attested by a notary public, that the applicant is a citizen and giving the place of the birth and age. This must be accompanied by the certificate of one other citizen to whom he is personally known that the statement made by the applicant is true. The department of state issues passports to citizens of the United States who wish to travel in foreign countries. If in a country where the government has no diplomatic representative, a consul may issue a new passport. The fee required is $1 and the time limit two years.

Pasteur, *Pas" tur',* **Louis** (1822-1895), a distinguished French scientist, born at Dôle. He early studied chemistry, taking his doctor's degree in 1847. After holding professorships in a number of universities he became professor of chemistry at the Sorbonne, Paris, and was chosen a member of the French Academy. Later, he founded the Pasteur Institute, where he continued his researches. His studies in bacteriology, in which he became the greatest authority of his time, were turned to practical applications of far-reaching importance. Pasteur demonstrated that fermentation and putrefaction are caused by the presence of countless living organisms. He also showed that bacteria were the cause of anthrax, or splenic fever, in cattle, of fowl-cholera and of the silkworm disease known as *pébrine.* He discovered that by inoculating animals with a weaker blood of the bacteria causing these respective diseases, these diseases could be prevented. He was also able to check hydrophobia by inoculation. This discovery was an epoch-making event in the science of disease, and its application has been widely extended in the practice of medicine. Branches of the Pasteur Institute have been established in all civilized countries.

Pasteur was a communicant of the Roman Catholic Church and a man of profound religious faith, which he declared was constantly made stronger by his researches. He was the author of numerous scientific works, all of which related to his investigations.

Pat"ago'nia, the long peninsula of southern South America, lying south of

the 39th parallel south latitude, and divided politically between Chile and Argentina. The Andes divide it physically, and the crest of the eastern ridge has, since the Treaty of 1881, been recognized as the political boundary of the two countries owning this region. The west coast of Patagonia is greatly indented, and the mountains, with their forested slopes, lie not far distant from the sea. On the east is an elevated plateau that descends to the sea by a series of terraces, in many places barren and arid and in others covered with rich vegetation. The numerous lakes are chiefly of glacial origin. The climate is unpleasant and high winds ordinarily prevail. The Patagonians are an Indian nation and wander over the plateaus and mountains, providing themselves with food from the streams and forests; they are especially distinguished by their great height. Patagonia was first visited by Magellan in 1520. See CHILE; ARGENTINA.

Pat'ent, in the United States a privilege from the government conveying or guaranteeing to the individual specified the sole right to make, use or dispose of some new invention or discovery for the period of 17 years. The duration of design patents, however, may be for 3½, 7 or 14 years. Should an infringement of the inventor's rights be discovered during that period, the government's records are available by the owner of the patent for the protection of his rights if any contest arises. In 1870 the whole system of patent legislation was revised and codified, being brought into its present condition. The United States Patent Office is a bureau of the Federal Department of the Interior and is in charge of a commissioner of patents.

To obtain a patent application must be made in a prescribed form, containing a petition and an oath that the applicant believes himself to be the first inventor. This is accompanied by a description of the invention with drawings or models, if conditions permit them. This application is investigated by an examiner and if the article is not already patented letters patent are issued. The fees are $15 with the application and $20 with the grant. It sometimes happens that an error has been made in descriptions or specifications have been defective, necessitating a new issue of the patent. In such cases another fee of $30 must be paid. If, however, the device is rejected by the examiner, there may be an appeal to a board of three of his fellow examiners, and from them to the commissioner of patents, whose decision is final.

The owner of a patent has the privilege of disposing of his patent by sale or by will and every right named as his is transferred to the new holder, but a renewal cannot be secured after a period of 17 years, the lifetime of the patent. The device then becomes public property.

Pater'nalism, a name applied to the theory and practice of a government which descends to the regulation and control of the social and business affairs of the people. The name is derived from the Latin *pater,* meaning father. This fatherly spirit is unknown in the institutions of the United States, as the Federal Government limits the exercise of its powers to the preservation and enforcement of justice and order. The German Empire before the World War was considered paternalistic by the students of governmental policies.

Pat'erson, N. J., a city and county seat of Passaic Co., 17 m. n.w. of New York and 12 m. n. of Newark, on both banks of the Passaic River, on the Morris Canal, which connects with the Delaware River and New York Bay, and on the Erie, the New York, Susquehanna & Western, the Delaware, Lackawanna & Western and other railroads. The city is chiefly built on a plain along the Passaic River. The extreme northern portion, however, lies among the hills near the Great Falls. The river here has a descent of 70 ft. with a perpendicular fall of 50 ft., which affords abundant water power for manufacturing purposes. A number of bridges cross the river below the picturesque falls, and an excellent system of interurban railways

connects Paterson with the many near-by towns and cities.

Parks and Boulevards. The parks and boulevards of Paterson present pleasing examples of landscape gardening. There are miles of well-paved and shaded streets and many handsome residences. The parks are situated at each end and throughout the city, two of them bordering on the river. Eastside Park contains 60 acres and the Westside 30 acres. Besides these parks the Garret and Preakness mountains near-by afford mammoth outing places for the residents of the city. In Cedar Lawn cemetery is the mausoleum of Garret A. Hobart, a vice-president of the United States.

Public Buildings. Among the prominent structures are the county courthouse built of white marble, Federal Building, city hall, nine bank buildings, Hamilton Clubhouse, Elks' Building, a lyceum and Y. M. C. A. and Y. W. C. A. buildings.

Institutions. The educational institutions include a high school, costing $500,000; a number of private schools; Columbia, MacChesney's, Phillips, Spencers's and Starkey's Business colleges; and a free library called the Danforth Memorial Library, erected in 1903-4 as a memorial to Charles Danforth, a locomotive builder, by his daughter, Mrs. Mary A. Ryle. Other institutions include St. Joseph's, Paterson General and Isolation hospitals; Children's Day Nursery with a building erected by Mrs. Garret A. Hobart; an old ladies' home; Paterson Eye and Ear Infirmary; Gallant Home for children; Dean McNulty Home for boys; Paterson Orphan Asylum; Home for aged men and women; St. Joseph's Orphan Asylum; Crittenton Home; and St. Thomas Home.

Industries. Paterson is the center of silk manufacturing in the United States and is known as the "Lyons of America." The city contains several hundred silk mills and silk-dyeing establishments, with an annual output of $35,000,000. There are large locomotive and bridge works, steel and iron works, breweries, cotton and woolen mills, shirt factories and linen mills and manufactories of plumbers' brass supplies, thread, jute twine, flax and tow machinery, tubing and insulating machinery, engines, boilers, carpets, velvets, silk machinery, paper boxes and general hardware.

History. Paterson had its origin in an act of the New Jersey Legislature incorporating the Society for the Establishing Useful Manufactures, which was chartered Nov. 22, 1791. In the summer of 1792 the site by the "Great Falls of the Passaic" was decided upon for the location of the mills and the town. Alexander Hamilton drew up the charter, and the place was named Paterson in honor of William Paterson, a delegate to the Continental Congress in 1780-81 and governor of New Jersey in 1790-93. In 1793 the first cotton yarn made in Paterson was spun in a mill run by ox power, and a year later, when the reservoir and dam were completed, the first cotton factory began its operations. Silk manufacture gradually supplanted that of cotton after 1840. Paterson was incorporated as a township in 1831, chartered as a city in 1851 and rechartered in 1861. Population in 1920, 135,875.

Paterson, William (1658-1719), a British financier, born in Dumfriesshire, Scotland. He went through England as a peddler, and lived at Bristol and in the Bahama Islands. Later he engaged successfully in trade in London, and in 1694 laid before merchants and capitalists of that city the complete draft of a scheme, which, with modifications, formed the basis of the incorporation known as the Bank of England. Paterson was one of the first directors of the bank, with which, for unknown reasons, he soon severed connections.

Pat'mos, an island in the Mediterranean Sea off the coast of Asia Minor, 20 m. s. of Samos. It is one of the Sporades group and belongs to Turkey. It is about 28 m. in circumference, and there is a good harbor on the east side. Commercially the island is unimportant. It is generally supposed to be the island to which St. John, the apostle, was banished.

Patricians, *Pa trish' uns.* See ROME, ANCIENT, subhead *Classes of Society.*

Pat'rick, Saint (about 389—about 461), apostle of the Irish, is generally believed to have been born in Brittany. When a young lad he was seized by an Irish pirate and carried off as prisoner. Thus for seven years he was a slave shepherd before he could effect his escape and return home. By this time, in answer to an inward voice, he had decided to enter the priesthood with the view of converting the Irish. After due study, Pope Celestine I commissioned him to this work, having first consecrated him bishop. Loigaire, King of the island, was so impressed by St. Patrick that he granted him permission to preach with no fear of annoyance. Converts multiplied so rapidly that in seven years St. Patrick had three associate bishops. In 455 he laid the cornerstone for the Irish Metropolitan Church at Armagh. St. Patrick's work is without a parallel. In 33 years he converted all Ireland, and that at the sacrifice of hardly one human life.

Pa'trons of Husbandry, a secret order organized in December, 1867, in the United States, for the promotion of the social and material interests of farmers and those engaged in allied industries. The local bodies were called granges and each state had its state grange. Membership was restricted to farmers, their wives and children. There were four degrees in local granges, one in state and two in national. In 1875 the membership of 1,500,000 was distributed throughout every state in the Union. Though a nonpolitical body, the influence of the order was important in the passing of several acts affecting the agricultural interests of the country, but the order finally lost prestige in connection with other legislation, and its members eventually became largely identified with the Farmers' Alliance and the Populist Party. See POLITICAL PARTIES IN THE UNITED STATES.

Patroons', a class of landholders in New York growing out of the plans of the Dutch West India Company for colonizing what was then New Netherland. This company granted a charter of "Privileges and Exemptions" to any members of the company who within four years would plant a colony of 50 anywhere in New Netherland except on Manhattan Island. Those to whom these privileges were granted were called patroons. They had absolute authority over their settlements for a term of years. The system soon aroused opposition and the charter was modified in 1640 to include any good citizen of New Netherland. The patroons had numerous quarrels with the colonial government and later with the state.

Patti, *Pat' e,* **Adelina Juaña Maria,** BARONESS CEDERSTRÖM (1843-1919), the famous soprano, was born at Madrid, the daughter of an Italian vocalist, Salvatore Patti. Her mother also was a singer, and the child began the study of her art at an early age. She came with her parents to America, where in 1859 she made her first public appearance as Lucia in Donizetti's opera *Lucia di Lammermoor.* In 1861 she became leading prima donna at Covent Garden, London, and almost from that time she enjoyed an international renown, singing the leading rôles of Italian opera in the principal musical centers. In 1868 she was married to Henri, Marquis de Caux, from whom she was divorced 17 years later. Her second husband was Nicolini, the tenor, who died in 1898; and the following year she married Baron Cederström, settling at Craig-y-Nos in Wales. Patti's voice in its prime was of a perfectly equalized scale, and the purity of its tone and penetrating brilliancy, combined with expressiveness, places it among the greatest of all time.

Pat'ton, Francis Landey (1843-), an American educator and clergyman, born in Warwick, Bermuda, and educated at Knox College, the University of Toronto and Princeton Seminary. He began his career as a minister, but in 1871 was appointed to a position on the faculty of what is now McCormick Theological Seminary, Chicago, where he remained ten years. During a part of

this time he edited *The Interior*. In 1881 he went to Princeton Theological Seminary to fill a professorship especially endowed for him, and in 1888 he was chosen president of Princeton College, succeeding James McCosh. During his administration the name of the institution was changed to Princeton University, and the scope of its work was broadened. In 1902 he resigned from the presidency of Princeton University, but was elected president of the seminary. This position he resigned in 1913. Dr. Patton is known as a forceful speaker and a keen and logical thinker. He has been a frequent contributor to periodicals and is the author of *Inspiration of the Scriptures* and *Summary of Christian Doctrine*.

Paul, the name of five popes. Paul I (757-767) succeeded his brother Stephen II. He maintained close relations with Pippin I. Paul II (1464-1471) made an attempt to form a Christian alliance against the Turks, but did not succeed. He opposed the claims of Louis XI of France to absolute power and attempted to suppress organizations and scholars that opposed religion. Paul III (1534-1549) called the Council of Trent and excommunicated Henry VIII of England. Paul IV (1555-1559) was noted for his enforcement among the clergy of the observance of clerical duties and the enactment of laws for the preservation of public morality. Paul V (1605-1621) was noted for his conflict with the Republic of Venice over the jurisdiction of the Venetian Senate in trials of the clergy who claimed the right to be tried by ecclesiastical tribunals. The trouble was finally settled by Henry IV of France.

Paul'ding, James Kirke (1779-1860), an American author, born in Pleasant Valley, N. Y. He collaborated with Washington Irving and with William Irving, his brother-in-law, in 1807, in publishing the series of humorous articles called *Salmagundi*. In 1812-14 he wrote the *Diverting History of John Bull and Brother Jonathan* and the *United States and England*, political pamphlets which attracted widespread attention. He was secretary to the board of navy commissioners from 1815 to 1823, navy agent in New York City from 1825 to 1837 and secretary of the navy from 1837 to 1841. His writings embrace poems, essays and tales. He was distinctively American, constantly protesting against too great intellectual servility to England. Among his works not previously mentioned are *Letters from the South, by a Northern Man; John Bull in America, or the New Munchausen; Koningsmarke; Merry Tales of the Three Wise Men of Gotham; The Dutchman's Fireside; Slavery in the United States;* and *The Puritan and His Daughter*.

Paul'ine Epistles, the name given to that part of the New Testament written by St. Paul. These Epistles have been variously grouped as doctrinal and pastoral, and then again in an arrangement with reference to the dates at which they were written. According to the first division, the doctrinal Epistles are *Romans, First Corinthians, Second Corinthians, Galatians, First Thessalonians, Second Thessalonians* (these six being sometimes known as the Missionary Epistles), *Ephesians, Philippians, Colossians, Philemon* (Epistles of the Captivity) and *Hebrews*. The Pastoral Epistles are *First Timothy, Second Timothy* and *Titus*. These Epistles of Paul, more than any of the other writings of the New Testament, form the basis of theology and the creeds of the Churches.

ROMANS, the letter written by Paul to the Romans, from Corinth, early in A. D. 55. After the usual salutation to the Romans there follows the doctrinal section in which Paul speaks first of justification by faith. All men had failed of perfect righteousness under the Law of Moses, and were, therefore, subject to the wrath of God. The death of the Christ furnished them means of salvation, and justification before the Law was to be found in personal faith in Jesus Christ. Then follows the teaching concerning sanctification, which was the perfecting of character by Christlike living. Then follows a section in which the prac-

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tical application of these doctrines to life is made.

First Corinthians, the first letter of Paul written to the Corinthians, from Ephesus, in the early spring of 54 A. D. After the usual salutation Paul rebukes the evils that have been reported to him in connection with the practices of the Church. He then replies to certain inquiries that have been made in a letter he has received from Corinth with reference to celibacy, marriage and divorce, things sacrificed to idols and order in Church meetings. He then explains the doctrine of the Resurrection of the Body.

Second Corinthians, the second letter written to the Corinthians, from Macedonia, A. D. 54. Paul begins this Epistle with salutation and thanksgiving, proceeds to make some explanation of certain phases of his own conduct that have given offense, and expresses his satisfaction that the causes for his offensive speech have been removed. He then speaks of his personal circumstances, gives directions as to the collections, strenuously denounces the disloyalty of the Church in supporting his enemies and slanderers, gives his blessing and speaks his farewell.

Galatians, the letter written by Paul to the Galatians. This is the earliest of all the New Testament writings, having been written A. D. 50, from Corinth. The letter is extremely doctrinal, the main theme being Paul's apostolic commission to preach the doctrine of salvation by faith and not by works. Certain Jewish teachers have followed Paul into some of the churches where he has preached, and taught that the Gentile Christians must be circumcised and keep the Law of Moses. Paul contends that if they seek to be saved by obedience to the Law, then they may not expect to be saved by grace, which is the favor of God shown in salvation, on the basis of faith in Jesus Christ.

Ephesians, the letter written to the Ephesians. This letter was written from prison in Rome, A. D. 58-60. After the usual salutation and prayer of thanksgiving, Paul proceeds to speak in answer to certain questions that have reached him, enlarging upon the doctrine of the grace of God, which the brethren should seek for the upbuilding of the Christlike nature within themselves, and for the spiritual success of the church.

Philippians, the letter written to the Philippians from Rome, A. D. 60. Following the usual salutation Paul speaks of his own condition and prospects and exhorts to unity among the brethren by seeking unity of mind in Christ. This unity in the mind of Christ can be secured by humility. He warns against the influence of those who are teaching salvation by the Law and emphasizes the righteousness that is by faith.

Colossians, the letter written to the Colossians. This letter was written from prison in Rome sometime between A. D. 58 and 60. Paul begins with a salutation, following it with thanksgiving and prayer. The Epistle is concerned with the refutation of certain speculations that have been rife in the Church. Paul accomplishes this refutation by speaking of the "mystery of God," who chose Christ to be the head of the universe, in whom his followers died to this world and rose to the heavenly. He teaches that as a result of this relation to Christ, the fleshly life of sin should be subdued.

First Thessalonians. The first letter of Paul to the Thessalonians was probably written from Corinth, A. D. 50. After salutation Paul proceeds to make a defense against the Jewish charges that the apostles were self-seeking deceivers. He speaks words of thanksgiving for the steadfastness of the Thessalonians under Jewish persecution, tells why he was not able to visit them in person and sent Timothy instead, and expresses his great relief at the report which Timothy brought to him. He states that he hopes to visit them in person soon, and commends them to God. He then exhorts the Christians to further progress, specifying purity of love and the manifestation of their love for each other in mutual helpfulness. He then speaks of the doctrine of the Resurrection and of the Coming of Christ, and gives some direc-

tions with reference to the administration of Church affairs.

SECOND THESSALONIANS. The second letter to the Thessalonians was probably written from Corinth, A. D. 50. This is really a letter supplementing his first letter to the Thessalonians. In this Paul corrects certain current misinterpretations of his teaching concerning the Coming of Christ and the Resurrection. He then exhorts to general watchfulness that they may all be ready for Christ's appearing.

FIRST TIMOTHY. The first letter of Paul to Timothy was written not later than A. D. 68. After his salutation Paul charges Timothy to refute all heretical teaching. He then proceeds to give him instructions concerning order in Church services and the appointment of Church officials, laying particular stress upon the duty of ministers to give careful instruction to all members of the Church and to guard against false teaching and errors in Church organization and administration.

SECOND TIMOTHY. The second letter to Timothy was written not later than A. D. 68. After salutation, thanksgiving and exhortation to loyalty to the apostolic trust, Paul speaks of certain personal conditions in his own life, and then proceeds with a charge to Timothy to be loyal. He impresses upon him the necessity of choosing faithful subordinates and guarding against unworthy teachers.

TITUS. The letter to Titus was written not later than A. D. 68. After his salutation Paul gives directions concerning appointments in the Church, to be made, with particular reference to the refutation of certain heretical doctrines. He then gives directions to Titus regarding his own conduct in administration of the affairs of the Church, and also with reference to his teaching.

PHILEMON, the letter written to Philemon, A. D. 58-60, from Rome. After a brief salutation with thanksgiving and prayer, Paul proceeds to speak of the slave Onesimus. Onesimus was the slave of Philemon, who had escaped from his master. Paul had taken him into his service and Onesimus was converted to Christianity. Knowing the circumstance of his escape from Philemon, Paul sends him back to his master, and in this letter urges upon Philemon the advice to treat Onesimus not as a slave but as a brother in Christ.

HEBREWS, the anonymous letter written A. D. 75-85, until recently attributed to Paul. It is now almost certain that Paul did not write this letter and the author is unknown. The letter itself, however, is full of sound and important teaching. The first division is taken up with the teaching that Christ is supreme over all the universe, higher than the angels, and that his administration is superior to that of Moses. Then follows the priestly significance of Christ, who was a "priest forever after the order of Melchizedek." Following this is the argument to prove the error of the teaching of those Jews who were insisting that Gentile Christians should keep the Law of Moses, the argument having to do largely with the ceremonial observances of Judaism. The writer proves that these ceremonials, as types and shadows of things to come, are fulfilled in Christ. He then proceeds to speak of the nature of faith as giving insight into the nature of the true Law of Christ.

Paul'ists, the name by which the Congregation of Missionary Priests of St. Paul the Apostle is commonly known. The order was founded in 1858 by five converts to Catholicism who were at that time priests of the Redemptorist Order. The first superior of the congregation was the Very Rev. Father Hecker. The Paulists are the only religious order of American origin and, except the Sulpicians, the only congregation that requires no absolute vows of its members. Organized for the purpose of doing missionary work in the United States, their strongest efforts are directed toward the conversion of non-Catholics. The order comprises about 100 priests and students, and has churches at New York, Chicago, San Francisco and Winchester (Tenn.). *The Catholic World* is published monthly

under the auspices of the Paulist community.

Paul, Saint, the name by which Saul of Tarsus was known soon after his conversion. Paul was born in Tarsus, a city of Asia Minor, about A. D. 3. His parents were Jews, and he became later a Roman citizen. His conversion to Christianity took place about A. D. 37, while he was on the way to Damascus to persecute the Christians. He did not enter immediately upon the work of preaching, but spent about two years in Arabia in retirement. After this he returned to Damascus, where his success in preaching the Gospel excited the bitter hostility of the Jews. A plot was formed for his assassination, but with the aid of his friends he escaped and went to Jerusalem. Here he was received with suspicion by the Christians, until he was introduced by Barnabas, when he came into full recognition. After a short time, because of designs on his life in Jerusalem, he retired to his native city, Tarsus, where he remained probably for two or three years, at the end of which time he entered upon the special labors to which he was destined.

This work began in Antioch, where collision occurred between Paul and those who insisted that the Gentile Christians must observe the Mosaic Law (Judaizers). About A. D. 45 Paul went forth on his first missionary journey. At the Apostolic Council at Jerusalem, held A. D. 50, Paul made a strong plea for the exemption of the Gentile Christians from the necessity of observing the Mosaic Law. His plea was successful. In A. D. 52 he departed on his second missionary journey, in which he was at great pains to make known the decrees of the Council at Jerusalem throughout the district that he had already evangelized. In the year A. D. 54 he left Antioch on his third missionary journey.

In all these journeys Paul was opposed by the Judaizers, who often incited the people against him, so that he suffered great persecution, being stoned and finally imprisoned. Having appealed to Cæsar, he was taken to Rome. The Bible record breaks abruptly in the midst of his imprisonment there. He was beheaded shortly before the death of Nero, A. D. 68. See PAULINE EPISTLES.

Pauncefote, *Pons' foot,* **Julian,** LORD (1828-1902), an English statesman, born at Munich, Germany. After studying in Paris and Geneva he began the practice of law in 1852. Fourteen years later he became attorney-general at Hongkong. He was honored with knighthood in 1874 and became undersecretary of foreign affairs in 1876. In 1889 he was sent to the United States, as minister from Great Britain, becoming ambassador in 1893. In association with Secretary Hay he completed the negotiations relative to the construction of the Panama Canal. His service was of a most helpful and pacific nature. See HAY-PAUNCEFOTE TREATY.

Pau'perism. See CHARITIES.

Pave'ment. See ROAD.

Pawnee', a tribe of North American Indians once living along the Platte River, Nebraska, and in Kansas. They were a hostile, warring tribe. They ceded their land gradually to the whites and are now on reservations in Oklahoma, where they are taking advantage of educational opportunities and making distinct progress.

Paw'paw". See PAPAW'.

Pawtuck'et, R. I., a city of Providence Co., 4 m. n.e. of Providence and 40 m. s.w. of Boston, on both sides of the Blackstone River and on the New York, New Haven & Hartford and other railroads. Electric-railway lines connect the near-by towns and cities. Below the Pawtucket Falls the Blackstone is known as the Pawtucket, or Seekonk, River. There is a fall of 50 ft. in the river at this point, which furnishes abundant water power for manufacturing purposes. The commerce of the city has been greatly increased by the deepening to 16 ft. and widening to 100 ft. of the river channel, by the United States Government.

Among the public buildings are the Sayles Memorial Library, a private classical school, a Y. M. C. A. Building, a

home for the aged, the Emergency State and Memorial hospitals, state armory, several public parks and the Collyer and Soldiers' monuments. Pawtucket is well known for the variety and extent of its manufactures. Calico printing is here done on the largest scale and the thread works are among the largest in the country. The chief manufacturing establishments include cotton and woolen mills, silk and plush factories, gymnasium-supply works, wireworks, yarn mills, textile dyeing and bleaching works, lumber mills, jewelry works, boot and shoe factories, nut and bolt works, die works, wagon and carriage factories, tanneries, twine and rope works, brass and iron foundries, horseshoe works and spool factories. There is also an important trade in lumber, cement, coal and other merchandise.

Pawtucket was settled about 1654. The eastern part of the city was originally in Bristol County, Mass., but it came into possession of Rhode Island in 1862. The portion west of the river was taken from the Township of North Providence and annexed to the Township of Pawtucket in 1874. The factory system of Rhode Island began in 1790, when a copartnership was formed in Pawtucket for carrying on the spinning of cotton. Samuel Slater, one of the partners, constructed the machines for the manufacture of cotton goods. This cotton factory was the first in the United States. The old mill is still standing. Pawtucket was granted a city charter in 1885. Population in 1920, 64,248.

Payne, *Pane,* **John Howard** (1791-1852), American actor and dramatist, born in New York City. When barely 13 years of age and acting as a merchant's clerk in New York City, he secretly edited *The Thespian Mirror.* He was in attendance at Union College for two years, but on account of his father's failure in business was obliged to assist in the support of the family. This he did by going upon the stage of the Park Theater, New York. He became a very successful actor in America, and in 1813 went to London, where he was equally successful on the stage, but was seriously lacking in business ability. During his stay in London, 1813-1832, Payne adapted many foreign plays and produced several of his own that were successful. In one of these, his opera *Clari, or the Maid of Milan, Home, Sweet Home* was sung for the first time. In 1832 he returned to America. From 1842 to 1845 he was consul at Tunis, Africa, and again from 1851 until his death. In 1883 his body was removed to Washington, D. C.

Payne, Sereno Elisha (1843-1914), an American lawyer and statesman, born in Hamilton, N. Y., and educated at the University of Rochester. At the age of 23 he began the practice of law in Auburn, N. Y. He was elected district attorney of Cayuga County in 1873 and to Congress continuously from 1889 to 1909. For a number of times he was the acknowledged Republican leader of the House. He took a prominent part in framing the McKinley and Dingley tariff bills, and as chairman of the ways and means committee with Senator Aldrich framed the Payne-Aldrich Tariff Bill of 1909.

Pea, a class of plants of the Pulse, or Pea, Family whose seeds, rich in nourishment, are widely used as food. All species are supposed to be descendants of wild plants growing near the Caspian Sea. Many wild peas are found in woodlands of temperate climates, but of chief interest are those grown in gardens. They have smooth stems, light green leaflets and generally curling tendrils. The flowers are white and butterflylike and are followed by pods containing the round, nutritious seeds. These are eaten green by man and are a favorite vegetable in the summer. In many places canning peas is an extensive industry. For cattle, peas are dried, shelled and ground, either alone or with other foods. The commonest peas are low plants that are ready to bear pods in the early summer. Some varieties, however, are tall and need to be supported upon poles or brush to which the tendrils may attach themselves. In field crops the

vines are allowed to trail upon the ground. Sweet peas, everlasting peas and chick peas are species which are cultivated for their fragrant, beautiful flowers.

Pea'body, George (1795-1869), an American merchant and philanthropist, born in a parish of Danvers (now Peabody), Mass. He entered into business at the age of 17 years as a dry-goods merchant in Georgetown, D. C., resuming business in Baltimore in 1815, after serving in the War of 1812. His success was so great that branch houses were established in New York and Philadelphia. Afterward he went to London, England, and established the firm of George Peabody & Company, spending the remainder of his life there. Peabody gave $200,000 to found the Peabody Institute and Library in Danvers, Mass; $150,000 to Yale University; a like amount to Harvard University; $140,000 to the Peabody Academy of Sciences, located at Salem, Mass; $1,250,000 to the Peabody Institute, Library, Art Gallery and Conservatory at Baltimore, Md.; $2,500,000 to assist in lodging London's poor; and over $3,000,000 to found the Peabody Education Fund for the Southern States of his native land. He died in London, and an English warship brought his body to America. See PEABODY EDUCATION FUND.

Peabody, Mass., a town of Essex Co., 2 m. w. of Salem, one of the county seats, and 16 m. from Boston, on the Boston & Maine Railroad. The villages of North Peabody, South Peabody and West Peabody are included within the limits of the town. Peabody has extensive manufactories of morocco, gloves, boots and shoes, leather-working machinery, marine hardware, glue, pumps, electrical supplies, thermometers and carriages. It is the seat of the Peabody Institute founded in 1852 by George Peabody, and the Eben Dale Sutton Reference Library. The town was incorporated as South Danvers in 1855 but the name was changed in 1868 in honor of George Peabody, who was born here. Population in 1920, 19,552.

Peabody Education Fund, a fund donated in 1867 and 1869 by George Peabody of Massachusetts, a wealthy merchant, for the purpose of aiding education in the Southern States. The original fund amounted to $3,100,000, but over $1,000,000 was in bonds of some of the Southern States, and these were repudiated on account of the Civil War. The fund is in charge of a board of trustees and has been increased over $2,000,000 by additional gifts. According to the provisions of the gift, after the first two years the principal was to remain without division for 30 years, when the trustees could decide how it should be used. During the first 30 years, more than $2,500,000 was disbursed by the trustees for the advancement of education, principally in the Southern States, and for the most part to encourage and improve the training of negro teachers. In 1905 the trustees voted to distribute the fund as soon as practicable after the expiration of the 30-year period, as permitted by the terms under which it was created. In 1910 they conveyed, from the principal, the sum of $1,000,000 to increase the permanent endowment of the George Peabody College for Teachers at Nashville, $500,000 being donated at the same time by the State of Tennessee and the city of Nashville. See PEABODY, GEORGE.

Peace Conference, International, a meeting held in May, June and July, 1899, at The Hague, the government seat of Netherlands. This Conference, which has been justly styled "the first great Parliament of Man," assembled on May 18, in response to an invitation addressed by the Czar of Russia on Aug. 24, 1898, to the principal states of the civilized world, with a view to concerted action for the maintenance of a general peace and the amelioration of the hardships of war, and to the possible reduction of the military and naval armaments of the world. Each nation was represented by prominent diplomats, jurists, men of affairs, soldiers and sailors. The United States representatives were Ambassador Andrew D. White, Minister Newel, General Crozier of the army, Captain Mahan

of the navy and Seth Low, later mayor of New York City.

To facilitate the work of the Conference three committees were formed, dealing respectively with armaments and engines of destruction, with humane regulations in warfare and with mediation and arbitration. Each of the great powers was represented on all of the committees and the delegation of each state had one vote on every proposal submitted to the Conference. The final act of the Conference signed July 29, 1899, comprised three conventions, or treaties, embodying the results arrived at by the committees. The first, and most important, was the convention for the peaceful adjustment of international disputes by the permanent institution of a court of arbitration in the midst of the independent powers, accessible to all. The second convention dealt with the laws and usages of war on land, and the third convention provided for the adaptation to naval warfare of the principles of the Geneva Convention of 1864.

COURT OF ARBITRATION. The greatest achievement of the Conference was the provision for the establishment of the Permanent Court of Arbitration with a bureau at The Hague. It also made it the duty of all governments to encourage the submission of disputes to the Court, and provided for the elaboration of a complete code of arbitration procedure. The convention was in the form of a treaty, and was ratified by the United States on Feb. 5, 1900. The Court has jurisdiction of all cases of arbitration, unless there has been an agreement between the parties of the controversy for the establishment of a special arbitration. The convention stipulated that each power name four persons to form the Permanent Court. The same person may be appointed by different powers and the members are appointed for six-year terms. Reappointment is permitted. When the powers wish to bring before the Permanent Court the settlement of a controversy which has arisen between them, the choice of arbitrators selected to constitute the tribunal which shall try the case is made from the general list of members of the Court. The arbitral functions can be conferred upon a single arbiter or upon several. Under the presidency of the Dutch minister of foreign affairs, the diplomatic agents of the signatory powers, in residence at The Hague, constitute a permanent council which serves as the office of the Permanent Court of Arbitration. The first cases adjudged by the Court were the Pious Fund Claim, a matter of dispute between the United States and Mexico, in 1902; and the Venezuela and various European difficulties in 1903. In 1912 the Court adjusted the long-standing fisheries dispute between Great Britain and the United States.

TEMPLE OF PEACE. On Apr. 25, 1903, Andrew Carnegie donated the sum of $1,500,000 for the erection of a Temple of Peace comprising a comprehensive library of international law, and a courthouse which could be used as a meeting place for the Permanent Court of Arbitration. The Government of Netherlands was appointed to act as trustee for the administration of this fund for the other signatory powers of The Hague Convention of July 29, 1899.

In the second Conference, which assembled in 1907, many principles of international law, commonly recognized, were codified into definite laws. At this Conference 44 nations were represented. The World War began before the time for holding the Third Conference.

Peace River, a river situated in Alberta and the North West Territories, Canada, rising in the Coast Range and forming one of the chief tributaries of the Mackenzie River. It flows about 600 m. northeast through the Rocky Mountains and combines with the waters of Lake Athabaska to form the Great Slave River, emptying into Great Slave Lake.

Peach, *Peech,* a small fruit-bearing tree of the Rose Family and known everywhere because of its delicious fruit. The tree of the cultivated species is kept from growing tall and bears shiny, long leaves much like those of the willow. The blossoms are of a beautiful, soft pink

shade, and render a peach orchard a lovely sight in the early spring; they are the state flower of Delaware. The fruit is too well known to need description. Its hard, wrinkled pit contains a bitter oil of almonds, which in large quantities is poisonous when taken into the stomach.

The growing of peaches is attended by great risks, since the buds and blossoms are easily killed by late frosts and even the winter buds are apt to be killed by too severely cold weather. They grow best in sandy soil and, since the lake regions provide this, as well as moderating the climate and protecting against frosts, peaches are extensively raised there. The trees should be carefully protected against the fungus diseases that are so apt to attack them (See FUNGICIDE), and the orchard should be well tended. The fruit should be thinned as it ripens so that no two peaches touch as they expand; the fruit is thus larger and of better quality. In the United States, Michigan, Georgia, Texas, California and New York lead in their production. The Elberta is the favorite variety because of its hardiness and productivity. Early Crawfords and Late Crawfords are also popular. Peaches are placed upon the market fresh, canned or dried.

Peacock, *Pe' kok"*, or **Peafowl,** a bird of the Pheasant Family, about the size of the domestic turkey. It is remarkable for its long upper tail coverts, which are greatly elongated to form a train. These tail coverts are made resplendent by many "eyes" of concentric rings of blue-black, green, copper and green, all with metallic reflections. The head, neck and breast of the male bird are purplish, with a yellowish-white spot behind the eye. The feathers of the back are metallic-green; the wings are mottled with white and black, edged with dark blue and buff; there is a tuft of feathers tipped with blue on the head. The female is brownish above and somewhat speckled; the under parts are white; the neck feathers are greenish, with buff margins.

The peacock is a native of the Indian Peninsula, and particularly of Ceylon. Its haunts are mountain slopes where there is good cover. The cock is polygamous and is usually seen with several hens. The eggs are laid on the ground, 25 or 30 in a nest, and there is but one brood yearly. The sexes are alike during the first two years, the male acquiring the long tail coverts the third year. Since the time of Solomon the peacock has been domesticated. The Romans used the brains and tongue as a dainty dish at their banquets. In many places in India this bird is protected by the superstition of the natives.

Peale, *Peel,* **Rembrandt** (1778-1860), an American painter, the son of the painter Charles W. Peale. After instruction with his father he studied in London with Benjamin West. His paintings cover a variety of subjects and include portraits, ideal groups and historical and classical scenes. His portrait of Washington was purchased by the Government of the United States.

Peanut, *Pe' nut,* or **Goo'ber,** a plant, or the nutlike fruit of this same plant, belonging to the Pulse, or Pea, Family. It is an erect herb with light green stems and yellowish-green leaves, which are made up of two pairs of oval leaflets, that stand in winglike position upon the stem. The flowers are much like those of the ordinary pea vine except that those of the peanut are smaller and yellow in color. After the flower has been fertilized, its stem lengthens, the head droops and pushes its way into the ground, where a two-seeded, nutlike pod is developed. These pods are the ordinary market peanut, sold fresh or roasted and now used to a great extent in the manufacture of peanut butter. The nuts are also used in making breakfast foods and an oil which is an ingredient of some soaps. The plant is cultivated in the Southern and Eastern states and may be grown indoors farther north.

Pear, *Pair,* a small tree of the Rose Family producing the familiar fruit of the same name. The many cultivated varieties are derived from a wild species probably native in Asia. The leaves of the pear are long, oval and shiny; the

blossoms are creamy white, but otherwise resemble the cherry blossoms. The tree itself is more like the apple, though smaller and less rugged. The sweet, juicy fruit, which is produced readily in many parts of the United States and is common upon the market everywhere, is conelike in form, but has a swollen base. The favorite varieties are the Bartlett, the Anjou and the Kieffer. The first two are the most desirable for table use and the last for canning and drying.

The pear grows best in a heavy, clayey soil and is short-lived in sandy regions. To produce good fruit, the trees must be well cared for, closely and carefully pruned and protected against fire blight and other diseases (See FUNGICIDE). The fruit is considered of better quality if picked green and allowed to ripen in the dark. In the United States, California, New York, Michigan, Oregon and Washington supply the market. In Europe, Italy and France lead in its production.

Pea Ridge, Battle of, a battle of the Civil War, fought at Pea Ridge, northern Arkansas, between 10,500 Federals, under Gen. S. R. Curtis, whose ablest assistant was Sigel, and some 16,000 Confederates under Price, McCulloch, Van Dorn and Pike, March 7 and 8, 1862. Curtis advanced on Springfield, Mo., to meet Price, who retired till, being reinforced, the united army attacked the Federal rear. During the engagement the Confederates were divided and McCulloch was killed, so that after what had at first seemed a victory, Van Dorn, who had chief command, ordered a retreat. Pea Ridge, which saved Missouri to the Union, was the only important battle of the war in which Indians fought, some 3500 under Pike aiding the Confederates.

Pearl, *Purl,* a curious product of certain shellfish. Most shell-covered marine animals line their shells with a secretion which gives to the otherwise rough material a smooth and beautiful inner surface. This secretion is deposited in transparent films on the walls of the shell, where it hardens, forming an iridescent coating, called nacre, or mother-of-pearl. If by any chance a grain of sand, a tiny worm, or other foreign substance which acts as an irritant, finds its way into the shell, the animal, unable to remove it and to prevent friction of the object with its delicate body, covers it with successive layers of this membranous substance. It is thus that pearls are formed. Pearls that are symmetrical in shape and entirely detached from the shell wall are valuable as gems. It sometimes happens that the animal is attacked by a parasite boring through the shell from the outside. It then deposits its secretion over the opening in the form of a half sphere. Pearls thus formed are blister pearls.

Pearls are found in almost any bivalve, or double, shells and in some single shells. Some of the most valuable seed pearls are found in fresh-water mussels; and the pearl oyster, giant clam and the pink conch shells of the West Indies are famous for their pearls. The abalone shells of the California coast yield a beautiful green nacre used for inlay work. The finest pearls are those of the East, the most famous coming from the pearl oysters of the Persian Gulf. Pearl oysters lie on the hard sea bottom at a depth of from 8 to 20 fathoms, usually in strong currents in narrow channels between groups of islands. The fishing is accomplished by divers working in crews. When a shipload has been gathered, the oysters in the shells are taken to the beach and spread out to decay, after which the pearls can easily be separated.

The fresh-water pearl industry of the United States is important. Numerous gem pearls have been discovered, and the annual yield of plate nacre, from which pearl buttons and similar articles are manufactured, is large. The industry is active in Tennessee, Kentucky, Wisconsin and Iowa. Among the important pearl fisheries, other than the ones already mentioned, are those in the Sulu Archipelago, off the Australian coast, in the Aru Islands, the Pearl Islands in the Bay of Panama, in the Red Sea, off the Philippines and Burma, and in the Persian Gulf and Ceylon.

Pearl River, a river of Mississippi. It rises near the northern boundary of Winston County, flows to the southwest, thence to the southeast, then to the south and enters the Gulf of Mexico. It forms a part of the eastern boundary of Louisiana. It is about 350 m. in length.

Peary, *Pe' ry,* **Robert Edwin** (1856-1920), an Arctic explorer, born in Cresson, Pa., and educated at Bowdoin College. In 1881 he entered the engineering department of the United States navy as civil engineer and was made assistant engineer of the Nicaragua Ship Canal, and in 1887-88 was in charge of the canal surveys. During this time he invented the rolling-lock gates for canals. In 1886 Peary examined the inland ice cap of Greenland, east of Disco Bay, and from June, 1891, until September, 1909, he made nine trips to the Arctic regions. These expeditions resulted in important scientific and geographic discoveries. Peary proved that Greenland was an island, discovered and named Melville Land and Heilprin Land north of Greenland, made a thorough study of the tribe of Arctic Highlanders, discovered Iron Mountain, which proved to consist of three enormous meteors, and made such observations as enabled geographers to correct the map of the North Polar regions. In 1896 and 1897 he brought the Cape York meteors to America.

Peary's crowning achievement was reaching the North Pole, on Apr. 6, 1909. The expedition left New York in the *Roosevelt* in July, 1908, and went into winter quarters at Cape Sheridan the following September. During the succeeding months preparations for a dash for the Pole were completed, and on March 1 the expedition started on its final journey. The party proceeded in five detachments, which were sent back one after another until only the detachment containing Peary, his colored attendant, Henson, and four Eskimos were left. This party reached the Pole on Apr. 6 and remained there for 30 hours. The return trip was accomplished in 16 days, and the *Roosevelt* reached Indian Harbor on her return voyage Sept. 5, whence Peary sent his famous dispatch to the Peary Arctic Club of New York: "Stars and Stripes nailed to North Pole."

Previous to the expedition Peary had been raised to the rank of commander in the navy and had received numerous medals for his achievements. Since reaching the Pole his work has been recognized by the learned societies of the world, most of whom have conferred medals upon him. He was promoted to the rank of rear-admiral and given the thanks of Congress by a special act of legislation. He ranks as the foremost Arctic explorer. He has published *Northward over the Great Ice, Nearest the Pole* and *The North Pole: Its Discovery in 1909.* See POLAR EXPLORATIONS.

Peat, *Peet,* the dead, closely interwoven stems of various mosses, chiefly sphagnum, which may be partially but not wholly decayed and which occur in great masses known as peat-bogs. The mosses have grown in great profusion and the new growth kills the old stems, but continues to grow upon and in them until a still newer growth takes its place. Thus great masses of the closely packed stems, rich in carbon, lie underneath the growing bogs of sphagnum moss. For many years peat has been used in Ireland and Scotland and northern Europe for fuel; it was merely dug and dried in being prepared for use. Recently peat presses have been established in the United States, which compress the "raw" peat, and cut it into bricks of convenient size for stove or fireplace use. Peat burns with a hot, smokeless flame, but is at present somewhat expensive on account of the lengthy process of preparation. See SPHAGNUM.

Pecan, *Pe kan',* a large handsome tree of the Walnut Family and closely related to the hickory. It has a gray, shallow-furrowed trunk and a round, spreading top, which bears a thick foliage of leaves made up of from 10 to 15 tapering, short-stemmed leaflets. The flowers bloom early in June and are of two kinds: the sterile, which grow in stemless catkins; and the fertile, which grow in two- to five-flowered clusters

that produce, sweet, edible nuts. These nuts are the pecans of commerce and are small, thin-shelled, olive-shaped nuts covered by a thin husk which splits when the seeds are ripe. The trees grow from Illinois south and are cultivated in large groves for the sake of the brown nuts, which are much improved in quality through care and cultivation. Pecans are sold everywhere in the markets of the United States in the autumn. The lumber of the pecan tree is valuable for handles of tools and for fuel.

The district in which the pecans grow is limited and the world's supply comes chiefly from the Southern States. The nuts have a fine flavor and are not perishable; hence they may be picked and handled without danger of injury. The trees are longer lived than most commercial nut trees, and the raising of them is a thriving industry in the area in which they may be grown with profit.

Peccary, *Pek' a ry,* a Mexican and South American member of the Peccary Family once classed among the swine and then known as the only native American swine. It is distinguished from wild swine by having no tail and a large gland in the middle of the back, which secretes a vile-smelling oil. In other respects it is very similar to the smaller breeds of hogs. Like them, it has a peculiar trotting gait, a labored breathing and a noncommittal grunt. It roots in the ground for its food, which consists of nuts, fallen fruit and juicy roots; when angry it elevates the bristles upon the ridge of its back and is capable of defending itself gallantly with its strong, sharp teeth.

There are two species of peccary: the collared, which is yellowish-gray with a white, collarlike streak about its neck; and the white-lipped, which is dark gray with white mouth and nose. Both species make their homes in hollow trees or deserted burrows; they are capable of domestication, but are not highly valued.

Pechili, *Pa' che le",* **Gulf of,** an arm of the Yellow Sea indenting the east coast of China and forming one of the many irregularities between Korea and the mainland. Many important rivers, chiefly the Hoangho and the Peiho, enter it, and the cities of Tientsin and Wei lie not far from its shores. The Straits of Pechili unite it with the Yellow Sea, and the Gulf of Liaotung is directly connected with it upon the north.

Peck, Harry Thurston (1856-1914), an American editor, critic and classical scholar, born in Stamford, Conn. He was editor-in-chief of *The International Encyclopædia,* and in 1901 became one of the editors of *The New International Encyclopædia.* From 1895 to 1907 he was editor of *The Bookman.* He published *A Dictionary of Classical Literature and Antiquities, Roman Life in Latin Prose and Verse, What is Good English?* and *Twenty Years of the Republic.*

Pecos, *Pa' kos,* **River,** a river of the United States. It rises in San Miguel County, N. M., flows in a southeasterly direction into Texas and enters the Rio Grande. Its length is about 800 m. It flows through arid table-lands, and portions of its course are through troughlike canyons.

Pedagogy, *Ped' a go" jy,* or **Pedagogics,** *Ped" a goj' iks,* the science and art of teaching. Pedagogy is derived from psychology and has a narrower scope than education. Pedagogy is confined to the principles and methods of teaching, but education includes these principles and the subject matter to which they are applied and all measures to make them effective. A knowledge of psychology is necessary as a foundation for the study of pedagogy. That right methods of instruction must depend upon and conform to the laws of mental development is a fact generally recognized by all educators; therefore courses in pedagogy form a part of the curriculum of every normal school and teachers' college. Elementary courses are also given in teachers' institutes and summer schools for the benefit of those teachers who are unable to attend normal schools. The subject can also be studied successfully through instruction by correspondence, and, lastly, any teacher can gain a good working knowledge of the science by

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reading some of the best pedagogical works and by careful perusal of some of the best educational journals.

PRINCIPLES. The science of pedagogy rests upon certain fundamental principles which are derived from the study of psychology. The most important of these are:

1. *Mind and Body.* There is a close relation between mind and body. The brain and nerves constitute the organism through which the mind acts.

From this general principle we derive the following laws, which should be heeded by everyone who in any way is responsible for a child's development:

(a) The mind works best when the body is in a state of health.

(b) Bodily comfort is necessary to the best mental activity.

(c) Fatigue lessens mental activity.

(d) Defective senses are a hindrance to mental activity.

(e) Strong mental and strong physical activity cannot occur together.

(f) Adolescence exerts a strong influence on mental activity.

2. *Development of the Mental Powers.* The mental powers develop with the growth of the body, particularly the nervous system, and in a natural order which never varies. This order is: (1) the powers of observation or perception; (2) memory; (3) imagination; (4) the thought powers, which are concept, reason and judgment; (5) the sensibilities or feelings; (6) the will.

The above order is given for the sake of clearness, but it should be remembered that the feelings and will are active at birth and that they develop along with the other powers. The following laws are derived from this principle:

(a) The mental powers are first awakened to activity by impressions brought to the mind through the organs of special sense. See SENSATION.

(b) The mind associates ideas according to the relations under which they are perceived. See IDEAS, ASSOCIATION OF.

(c) Feeling accompanies every conscious mental act.

(d) The activity of each mental power is dependent upon the powers previously developed.

(e) All mental powers are active in each complete mental act.

(f) The harmonious development of all mental powers should be secured.

(g) Each mental power when properly developed strengthens all the others.

(h) Those in charge of the child's education should remove all obstructions to its mental development.

3. *Acquisition of Knowledge.* All knowledge is acquired by the self-activity of the learner. There can be no partnership in learning. The child instructs himself. Those in charge of his education should remove obstacles and point the way, taking care to increase the difficulty of his tasks in proportion to his gain in mental power.

4. *Attention.* Attention lies at the foundation of all knowledge. Attention is mental concentration, or the mind's power to direct its own activities. It requires the exercise of the will and its development is essential to a well-trained mind. See ATTENTION.

5. *Interest.* Interest is the basis of attention. By interest is meant the feeling of satisfaction which one finds in a subject. Interest is peculiar to the individual. A subject that satisfies one child makes little or no appeal to another. Every successful teacher takes these individual preferences into account. See INTEREST.

6. *Order of Instruction.* Instruction should proceed in accordance with the natural development of the mind.

(a) Observation precedes reason.

(b) The concrete must precede the abstract.

(c) The whole must be presented before a part.

(d) Instruction should pass from the simple to the complex.

(e) Instruction should pass from the known to the related unknown.

(f) The particular should be presented before the general. Facts should be presented before definitions, and processes before principles and rules.

(g) The transition must be from the general to the related particular.

METHODS. It is the purpose of methods of teaching to apply the foregoing principles in presenting the subject matter of education. Methods are classified according to their scope into general method and special method, and, according to their mode of procedure, into inductive method and deductive method.

General Method. General method is concerned with the application of the principles of pedagogy to the teaching of all subjects, and is, therefore, universal. However, it needs adaptation to the various subjects in the course of study.

Special Method. Special method is the application of general method to any branch of learning, such as arithmetic or language. Its purpose is to adapt the general principles of pedagogy to the subject in hand by the selection of such illustrations and devices as will make the study of the subject interesting and profitable to the pupils and as will enable them to proceed in a logical manner. One attempting to use special methods without a knowledge of general method is liable to violate the laws of mental development.

Inductive Method. The inductive method proceeds from the individual notion to the class notion, or from the particular to the general. It is often called the observation method. See INDUCTIVE METHOD.

Deductive Method. The deductive method proceeds from the general to the particular. It saves time and is well suited to instruction of adult students. See DEDUCTIVE METHOD.

SCHOOL ECONOMICS. The organization, management and description of a school are so closely related to successful teaching that school economics may properly be considered as a division of the science of pedagogy. See PSYCHOLOGY; MEMORY; IMAGINATION; THOUGHT; EMOTIONS; WILL. Consult Salisbury, *The Theory of Teaching;* Halleck, *Education of the Central Nervous System;* Smith, *Methodology;* White, *School Management.*

Pedee, Great, the name of a river of North and South Carolina. It rises in the northern part of Iredell County, N. C., flows southeasterly and enters Winyaw Bay, crossing the northeastern part of South Carolina. The Little Pedee, its most important tributary, rises in North Carolina, flows southward and joins the main stream about 40 m. from its mouth. The portion of the Great Pedee in North Carolina is called the Yadkin.

Pedom'eter, a device having a dial with a pointer and a chain of wheels by which distances are measured in walking. It has a weighted lever which operates the mechanism at each step taken. By knowing the length of one's pace and multiplying it by the number of steps indicated on the dial, the distance walked is found. The instrument is usually carried in the pocket. See CYCLOMETER.

Peeks'kill, N. Y., a city of Westchester Co., 41 m. n. of New York City, on the east bank of the Hudson River, below the Highlands of the Hudson at Anthony's Nose and on the New York Central & Hudson River Railroad. It contains the Peekskill Academy, State Military Camp, Field Library, St. Joseph's Home and the Helping Hand Hospital. Peekskill derives its name from Jans Peek, an early Dutch navigator. It was at this place that Arnold first learned of the capture of André. There are manufactures of fire brick, stoves, charcoal products, hats, underwear, distilled liquors, yeast, etc. Peekskill was settled in 1764. Population in 1920, 15,868.

Peel, Sir Robert (1788-1850), an eminent British statesman, born near Bury, Lancashire, and educated at Christ Church College. His father was a wealthy cotton manufacturer. At the age of 22, Peel entered Parliament, and most of his time during the remainder of his life was devoted to public affairs. In 1812 he became secretary for Ireland and held the office for six years. He soon showed great ability as an orator, an organizer and a financier. In 1828 he became home secretary and leader of the House of Commons in the Duke of

Wellington's ministry. Under his leadership the Catholic Emancipation Act was passed. This measure aroused a strong opposition, but his resistance to the Reform Bill won the allegiance of his party, and under his management the great Conservative Party was brought into power. In 1841 he became first lord of the treasury, and in the years immediately following he reformed the financial system to such an extent that an annual deficit of more than £2,000,000 was changed to a surplus. During this period the Bank Charter Act was passed, and it has ever since regulated the currency of the country. It was during his term of office also that the Corn Laws were repealed, in 1846. Soon after this he retired from Parliament, but during his life he continued to exert great influence on public affairs. See CORN LAWS.

Pee'pul, or **Sacred Fig,** an Eastern tree of the Breadfruit Family, closely related to the common fig. It is a tall tree, often attaining a height of 100 ft., and bears broad leaves which are rounding at the base and very long-pointed at the apex. The tree is chiefly of interest because the Buddhists claim that it is the tree under which Gautama rested for 40 days before he became the Buddha. The Hindus also hold it sacred for they believe that Vishnu was born within its shade. For this reason it is planted near temples and in sacred groves. The fruit is sweet but not commonly prized. The lac insects feed upon the branches and it is thus rendered of some commercial value. The tree is variously called pipal and bo tree. See LAC.

Peg'asus, in classical myths, a winged horse, which Neptune formed from the blooddrops falling from Medusa's neck when Perseus severed her head. He belonged to the Muses. Caught by Bellerophon, he helped him kill the Chimæra. Later he was made a constellation by Jupiter. See BELLEROPHON; CHIMÆRA.

Pe'kin, Ill., a city and the county seat of Tazewell Co., 9 m. below Peoria, on the Illinois River and on the Illinois Central, the Big Four, the Chicago & Alton, the Atchison, Topeka & Santa Fe and other railroads. Located in a fertile agricultural region, in the vicinity of productive coal fields and on navigable water, the city is an important market and has a large export trade. Grain is

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one of the chief products. In the town are many important industries, foundries, chemical and malt works, sugar refineries, reaper, wagon and plow factories. There are numerous schools and a free library. Settled in 1829, Pekin was incorporated in 1850 and chartered in 1875. Population in 1920, 12,086.

Pe"king', the capital of the Chinese Republic, situated in the Province of Pechili, or Chili. It is divided into the Inner, or Tartar, and the Outer, or Chinese, City, both being surrounded by a wall 30 m. in circumference. The wall is kept in good order, and entrance to the city is afforded by 16 gates, each one surmounted by a high tower. The area enclosed is about 25 sq. m., and although the population is numerous, the city gives no appearance of being crowded or closely built. From the walls can be seen several gardens, groves of trees and the roofs of the houses and temples gay with their colored tiles. The Tartar, or Imperial, City encloses the "Forbidden

City," in which is found the royal palace, reception halls, pavilions and pleasure grounds. Here also are the Bell Tower, containing a bell whose deep tones are heard during the night watches; the Drum Tower with its incense sticks marking the flight of time; the residence of the "governor of the city;" the government offices, temples and parks. The Chinese City contains the Altar of Heaven, surrounded with temples and shrines.

As a center of government Peking attracts a great number of officials together with their families. There are also several mission schools, and it is the location for the Imperial University and the Imperial Observatory. Government examinations are regularly conducted in this city. Recently some of the streets have been macadamized and since 1900 attempts have been made to improve the drainage system. Although the city is open to foreign commerce, there is very little trade, and the manufactures are chiefly for home use. In 1897 a railroad was opened between Peking and Tientsin, and the city now is connected with Europe indirectly by means of the Trans-Siberian Railway. The early history of Peking is unknown. In 986 a force of Khitan Tartars invaded it and made it their headquarters, calling it Nanking, or the "Southern Capital." Kublai Kahn, reigning from 1280 to 1294, rebuilt the town. Population, estimated in 1911 at 692,850.

Pe'lias, in classic mythology, brother of Æson, whose throne in Thessaly he usurped. In order to keep possession of this throne, he sent Æson's son, Jason, in quest of the golden fleece. He was later killed by Medea. See JASON; ARGONAUTS.

Pelican, *Pel' i kan,* **Family,** birds distinguished by their heavy bodies, short legs with webbed feet, and by the presence of a large elastic pouch of skin attached to the lower mandible, the upper mandible being hooked at the tip. Two pelicans are common in North America. The white pelican reaches a length of six feet, the huge wings having a spread of ten feet. The plumage is white all over, with part of the wing feathers black and with a yellowish crest on the back of the head. In the nesting season the upper mandible has an upright, horny growth. The nest is placed on the ground in places not much frequented by man, and is usually made of sticks and weeds. One to three dull-white, rough eggs are laid. The brown pelican is brownish, with a straw-colored head and a patch of the same color on the breast. A white stripe runs down the side of the neck. The nest is made of sticks and is placed on the ground or in a low bush. Pelicans nest in large colonies, the white pelican in the Far North and the brown pelican from Florida south to Brazil.

Pellagra, *Pe lag' ra,* a chronic disease common in northern Italy, Spain and France, especially among the poorer classes unable to obtain nourishing food. It was formerly supposed to be caused by the eating of spoiled Indian corn, since it was frequent in times of famine when the fermented grain was eaten. The disease manifests itself in disturbances of the stomach and intestines, sleeplessness, eruptions upon the skin, pains in the back and head and, in the latter stages, by spasms, paralysis and deep mental depression. The suffering generally begins in the spring and becomes more intense through the summer, but gradually wears away during the fall and winter. Each succeeding year, however, it becomes worse and the sufferer becomes thinner, more languid and more enfeebled. The sight, hearing and taste become vitiated and the mental condition frequently reaches insanity.

Investigation of the disease has brought to light many theories as to its origin, none of which has as yet been wholly proven. The most widely accepted theory is that the disease is caused by an animal organism which is communicated by sandflies, as the sleeping sickness is by the tsetse. The treatment at present is chiefly by means of a system of dieting, which serves to build up the organs and to give them sufficient

vitality to throw off the disease. Pellagra has been reported in many parts of the British Empire and, since 1906, has not been uncommon in some parts of the United States.

Pelop'idas (?-364 B. C.), a famous Theban general, the associate of Epaminondas. In 382 B. C., having been driven from Thebes by the oligarchic party, supported by the Spartans, he fled to Athens, but returned in 379 B. C., gained control of the citadel and set up a democratic form of government. In 371 B. C., when a Spartan army invaded Bœotia to crush the Thebans, Pelopidas supported Epaminondas at the famous Battle of Leuctra, where the Spartans were overwhelmingly defeated. Pelopidas later led the Thebans against the cruel tyrant Alexander of Pheræ, whom he defeated in 364 B. C. at Cynoscephalæ, but was himself killed. See EPAMINONDAS.

Pel"oponne'sian War. See ATHENS, subhead *Peloponnesian War.*

Peloponnesus, the ancient name of the peninsula forming the southern part of ancient Greece. It is now called the Morea. The Peloponnesus was divided into six districts: Argolis, Laconia, Messenia, Elis, Achæa and Arcadia. Sparta, in Laconia, was its most famous city. See GREECE; SPARTA.

Pe'lops, in Greek myths, son of Tantalus and brother of Niobe. Feasting the gods one day, Tantalus served them his son to test their omniscience. Recognizing the dish, all the gods refused to eat save absent-minded Ceres, who was grieving for her lost Proserpine. Later, Mercury restored the boy to life, when Ceres furnished him an ivory shoulder with healing properties. Pelops, aided by Neptune, won for his bride Hippodamia. He then became King of Elis and, subsequently, of the vast country called for him the Peloponnesus.

Pem'berton, John Clifford (1814-1881), an American soldier, born in Philadelphia, Pa., and educated at West Point. Entering the artillery service, he served in the Seminole War and was aide-de-camp to General Worth in the war with Mexico, becoming major after the Battle of Molino del Rey. He entered the Confederate service in April, 1861, as colonel of cavalry and assistant adjutant-general to Gen. J. E. Johnston. Soon he became major-general. In 1863, in northern Mississippi, he opposed Grant, to whom he was finally forced to surrender Vicksburg after a skillful defense of several months. Following the war he became a planter in Virginia; but after 1876 he lived in Pennsylvania.

Pen, an instrument employed in writing with a fluid ink. The ancients used a reed, sharpened at the end into a point, when they wrote upon parchment or papyrus, and a pointed needle or stylus made of metal, bone or ivory when they wrote upon tablets coated with wax. Pens made of reeds and bamboo are still used in Persia and in other countries where the writing materials are not suitable for pens or metal, and the Chinese and Japanese make their characters with a small, pointed hairbrush and India ink. After the introduction of paper suitable for writing purposes, quill pens came into general use and continued until the beginning of the 19th century. These were made from the quills of the goose, turkey, swan, crow and ostrich; those from the wings of the goose were considered the best.

Steel pens began to appear in England about 1800, having a barrel or cylinder of steel forming the holder and the point all in one piece, and in shape resembling the quill pen. These pens lacked flexibility and had rough points that scratched the paper. This defect and their high price prevented their general use. In 1820 Joseph Gillott, of Birmingham, England, perfected means for rolling thin bands of steel and stamping them with dies, so as to cut out what we now know as pen points. The method employed by him is practically followed at the present time, the pens being made entirely by machinery.

Birmingham, England, is the chief center of the steel-pen industry, and over 30,000,000 pens are made in that city weekly. Pens are also manufactured

in France, Germany and the United States, the largest factories being in and about New York City. The quantity of steel used in the manufacture of pens exceeds the quantity used in the manufacture of guns, swords and needles for the same length of time. Gold pens are made of gold alloy, which is elastic, and they have the point tipped with iridium, a very hard metal, to keep it from wearing. The manufacture of gold pens is a distinctive American industry. Fountain pens have a hollow stalk or barrel, which is filled with ink that feeds the pen as one writes. The stylograph pen is a fountain pen that has a fine wire instead of a gold pen for writing.

Penang', an island lying off the west coast of the Malay Peninsula at the north entrance of the Strait of Malacca. It is 15 m. long and has an area of 107 sq. m. The northern part is mountainous, but the other parts are level or undulating. The surface is densely wooded, and the island presents a beautiful appearance. The chief products are pepper, coconuts, rice, cotton, indigo, tobacco and coffee. The climate is healthful. Penang is a British possession and one of the Straits Settlements. Population of the settlement, about 248,000.

Pencil, *Pen' sil,* an instrument used for marking, drawing, writing and painting. It usually consists of a casing of wood surrounding a slender stick of black lead, or graphite, slate, chalk or other materials, or it may consist only of a cylindrical piece of marking material like chalk, slate, charcoal or graphite, and is then generally known as a crayon. The first pencils used were probably pieces of colored earth or clay cut into a shape suitable and convenient for holding in the hand. The Egyptians and Greeks drew their one-color pictures with such pencils. The slate pencils in common use are made of soapstone, and resemble those of ancient times. Formerly small sticks of pure lead were used for writing, but the lead made an indistinct mark, and a more suitable substance was sought. This was found in graphite. However, when the substance was changed, the name remained, and the term *lead pencil,* so common today, is due to the early use of lead for writing. Not only did the old name remain, but it was applied to the new writing substance, which was called black lead, though it contained no lead whatever.

In the manufacture of lead pencils the graphite is ground to a fine powder and cleansed from all impurities by washing. The powdered graphite is then mixed with pipe clay, the proportions depending upon the degree of hardness desired. For the hard pencils used in sketching, equal parts of clay and graphite are required; for the softer pencils used in writing, a larger proportion of graphite is required. The mixture is ground in water, forming a sort of dough. This is placed in steel cylinders, having one end perforated with holes the size of the lead and fitted with a piston, which is forced into the cylinder by a screw; a hydraulic pressure then forces the dough through the holes in the opposite end of the cylinder and forms the leads, which are coiled on a shelf while moist. The leads are straightened and cut into sections three feet long. They are then baked in an oven until thoroughly dry, when they are ready for the cases.

The casings are made of red cedar or of pine. The lumber is cut into slabs seven inches long and wide enough to contain six pencils. These slabs are then grooved; the leads are placed in one; and another is glued to it, the glued slabs being dried under great pressure. When thoroughly dry the slabs are made into pencils, all the work being done by machinery. Lead pencils are made in Germany, France, England and the United States. The great pencil factories of this country are near New York City, the graphite for most of them being obtained near Ticonderoga, N. Y. See GRAPHITE.

Pen'dleton, George Hunt (1825-1889), a United States senator, born in Cincinnati, Ohio. After receiving an

academic education he studied law and was admitted to the bar, beginning practice in his native city. In 1854-55 he was a member of the State Senate, and from 1857 to 1865 served in Congress. He was nominated by the Democratic Party for vice-president in 1864. From 1879 to 1885 he was in the United States Senate, where, as chairman of the committee on civil service reform, he secured the passage of a law establishing the merit system in civil appointments. In 1885 he was made minister to Germany by President Cleveland, and held that position until his death.

Pen'dulum, a weight hung by a string or by an inflexible rod in such a manner that it swings freely by force of gravity. If drawn from its position of rest, gravity causes it to return and to rise to the same height on the opposite side, from which it again descends. If unhindered, its vibrations never cease. A single vibration is the motion of the pendulum from the highest point on one side to the highest point on the other side. From the center of this arc to the highest point on either side is the amplitude of vibration. The axis of the pendulum is a line drawn from the point of suspension to the center of gravity of the weight. The curved motion of the weight is due to the two forces acting upon it; one, the force of gravity; the other, the resistance of the string or rod.

The time in which a pendulum vibrates differs with the length of the pendulum, a fact easily observed by suspending a weight from a string four feet long and watching its vibrations; then shortening the string to one foot in length and observing it again. It has been found that the time in which a pendulum makes a vibration varies as the square root of its length: thus in the case above, a vibration of the second pendulum would be made in one-half of the time that one of the first is made. Since the force of gravity differs with different latitudes, increasing toward the poles, the length of a pendulum for beating seconds also varies in different places, and one which varies seconds at the equator vibrates faster at the poles; and since the force of gravity decreases with the altitude above sea level, a pendulum that vibrates seconds at sea level vibrates more slowly on top of a mountain.

The pendulum of a clock consists of a weight, or bob, attached to a rod. The clock is regulated by lengthening or shortening the pendulum in order to increase or decrease its time of vibration (See CLOCK). A metronome acts upon the same principle and beats the different times according to the adjustment of the weight (See METRONOME). Since heat expands metals, the axis of the pendulum in clocks lengthens perceptibly in warm weather and contracts in cold; thus, clocks exposed to extremes of temperature gain time in cold weather and lose in warm weather. To remedy this defect compensation pendulums are used. These are made of alternate rods of steel and brass held together at top and bottom by crossbars. The rates of expansion of brass and steel are unequal, and the effect of one is neutralized by the other when the rods are so arranged that some expand downward while others expand upward. Another form of compensation pendulum is that known as the mercurial pendulum, in which the weight consists of a jar of mercury that terminates the steel rod. As the rod expands, lengthening the pendulum, the mercury also expands upward, thus raising the pendulum bob and keeping the working length of the pendulum the same.

Penelope, *Pe nel' o pe,* the wife of Ulysses. Her husband's long absence after the Trojan War was over, led to the general belief in his death. She put off her importunate suitors on the pretext that she must first weave a shroud for Laertes, her old father-in-law, before she could marry again. She prolonged this task by undoing by night the work she had woven by day. Her suitors discovered this, but Ulysses came back just in time to save her from any more annoyance from them. In Greek and later literature she was the type of the faithful wife.

Penguin, *Pen' gwin,* a bird with duck-shaped body, very short legs, webbed feet and a pointed bill. The wings are reduced to flipperlike organs and are covered with scalelike feathers. The penguins are incapable of flight, and on land waddle along in an upright position. In the water they are quite at home, swimming rapidly with the aid of their paddlelike wings. On land they sometimes lie flat and proceed in a scrambling manner, using both feet and wings. There are about 20 species confined to the Antarctic regions. They dwell in colonies, nesting on the bare rocks, one or two whitish eggs being laid in a burrow or depression. In size they range from 18 to 48 inches.

The king penguin is one of the largest and best-known species, being three feet in height. It has bluish-gray upper parts and wings, white under parts and a band of yellow or orange under the neck, running up on each side of the neck to the back of the head. The whole head is black and the lower mandible is lavender. The king penguins incubate the egg in a fold of the skin between the legs. These birds are found in large numbers around the Strait of Magellan and adjacent islands. The feathers on the breast are remarkably soft and close, and this part of the bird is extensively used by fur dealers.

Penin'sula Campaign, during the Civil War the name given to McClellan's march against Richmond, Va., between April and July, 1862, on the way to the peninsula which extends from the York River to the James. McClellan was in command of the Federal Army of the Potomac (See McCLELLAN, GEORGE BRINTON; CIVIL WAR IN AMERICA). Landing his men at Fortress Monroe, Apr. 2, McClellan advanced to Yorktown, which he besieged for a month, only to have the Confederates escape from him and from Hooker, who pursued them to Williamsburg (See WILLIAMSBURG, BATTLE OF). He then moved up to White House, where he established his base of supplies. From here the army crossed to the banks of the Chickahominy, a part being stationed at Seven Pines and Fair Oaks, the rest, along the north of the river to Mechanicsville. McClellan now expected to be joined by McDowell's corps, 40,000 strong. But McDowell was recalled to protect Washington from "Stonewall" Jackson, who, with 20,000 Confederates, had rushed through the Shenandoah Valley, winning four severe battles in 35 days, and afterwards hurrying to Richmond.

Thus McClellan alone had to meet Johnston in the severe but indecisive fight at Fair Oaks, six miles from Richmond, May 31. Here Johnston was wounded, and Lee assumed command of the Army of Northern Virginia. With Jackson's reinforcement, Lee now attacked the Union right wing under Porter in the Battle of Mechanicsville, June 26, where he suffered defeat (See MECHANICSVILLE, BATTLE OF). This opened what is known as the Seven Days' Battles, June 26-July 2, the subsequent engagements of which, at Gaines's Mill, White Oak Swamp, Frazier's Farm and Malvern Hill (See MALVERN HILL, BATTLE OF) were, on the whole, unfavorable to the Union cause. Having retreated to Harrison's Landing, on the James River, McClellan reorganized his forces and embarked for Washington. The entire campaign had cost the Federals 15,249 men; the Confederates, some 19,000. Richmond had not been reached, though it might have been, and the confidence of the North had weakened in proportion as that of the South rose. Moreover, the Confederates had secured many prisoners and great quantities of ammunition and artillery.

Penn, William (1644-1718), founder of Pennsylvania, born in London. Because of Quaker tendencies and a refusal to attend regular devotions, he was expelled from Oxford, after a two years' residence. This enraged his father, Admiral Penn, who turned him out of doors, and sent him to Europe to be cured of his folly. However, in 1668, Penn became a Quaker preacher. Because of his essay, *The Sandy Foundation Shaken,* he had to spend seven

months in the Tower, where he wrote *No Cross, No Crown* and *Innocency with her Open Face.*

In 1681, in lieu of $80,000 which the Crown owed to his father, Penn received a grant of land in America. Charles II insisted that it be called Pennsylvania, for the Admiral; otherwise Penn might establish such laws and institutions as embodied his principles. The first settlement was made in 1682, and in an address sent over, Penn, as governor, stated that he did not aim to increase his own wealth, but that he had "an honest mind to do uprightly;" further, that he would never "usurp the right of any, or oppress his person." Late in 1682, Penn himself arrived and laid out Philadelphia. The first assembly, at Chester, adopted his most liberal *Frame of Government.* He won the love of the Indians by personal visits. In 1684 he returned to England in the interests of the colony.

In 1699 he returned to Pennsylvania, intending to make it his permanent home. The report, however, that Parliament intended to abrogate his charter, took him back to England in 1701. In 1712, disheartened by debts and by dissension in his colony, he planned to sell his rights to the Crown for about $60,000. Illness unfitted him for business before the sale was consummated, and he died a few years later. Among the best biographies of Penn are that by Janney (1852) and Fisher's *The True William Penn.*

Penn'ell, Joseph (1860-), an eminent American etcher and illustrator, born in Philadelphia. With the assistance of his wife, Elizabeth Robins Pennell, he has produced several books, notably a biography of J. M. Whistler. But it is as an illustrator, lithographer and etcher that he is chiefly distinguished. His work is vigorous and shows intellectual grasp, and is marked by striking treatments of light and dark. It includes a number of Italian and English subjects, among the latter the *Thames Embankment* and the *Nelson Monument.*

Pennsylvania, *Pen" sil va' ni a,* THE KEYSTONE STATE, one of the Middle Atlantic States, is bounded on the n. by Lake Erie and New York, on the e. by New Jersey, on the s. by Delaware, Maryland and West Virginia and on the w. by West Virginia and Ohio. The eastern boundary is formed by the Delaware River.

SIZE. The breadth from east to west is 302 m. The length is 180 m. and the area is 45,126 sq. m., of which 294 sq. m. are water. Pennsylvania is a little smaller than New York, about the size of Virginia and Delaware combined and about nine-tenths the size of England. It is the 32nd state in area.

POPULATION. In 1920 the population was 8,720,017. Between 1910 and 1920 there was a gain in population of 1,054,906, or 13.8 per cent. There are 194.5 inhabitants to the square mile. The state has the second largest population in the Union, being exceeded only by New York.

SURFACE. Parallel ranges of the Allegheny Mountains cross the southern boundary between its eastern and western extremities, and extend across the state in a northeast direction. These are low mountains with rounded summits. Blue Mountain, 3136 ft., in Bedford County, near the southern border, is the highest elevation within the state. A few other peaks exceed 2000 ft. These mountains are wooded, have steep east slopes and more gradual west slopes. The ranges are separated by narrow valleys, which in some instances are crossed by ranges of hills, thus making the region very complex. The most significant of these valleys is that occupied by the Susquehanna and known in the early history of the state as the "Great Valley." The eastern and southern parts of the state are low, but rolling, and belong to the Valley of the Delaware.

The region to the north and the west of the mountains is a plateau which extends the entire length of the northern boundary and varies in altitude from 1000 ft. in the east to 2000 ft. west of the center. In the western part of the

state this plateau slopes gradually to the south and west. In many places it is dissected by rivers which have worn deep valleys in its surface. The most conspicuous of these valleys are those of the Allegheny and the Monongahela. In the northwestern part of the state there is a small region which slopes toward Lake Erie.

Rivers and Lakes. Pennsylvania is divided into three great drainage systems: the Delaware, the Susquehanna and the Ohio. The Delaware drains that part of the state east of the mountains. Rising in the southern part of New York, this stream cuts its way through the Kittatinny Mountains, forming the famous Delaware Water Gap (See Delaware River). Its chief tributaries from Pennsylvania are the Lehigh and the Schuylkill. The Susquehanna drains the mountain region and a portion of the plateau region. It flows across the state in an irregular course, north and south. Its chief tributaries are the West Branch and the Juniata. The western part of the state belongs to the Ohio basin and is drained by the Allegheny and Monongahela and their tributaries. A small section in the center is drained by the Genesee into Lake Ontario, and another small section in the south is drained into the Potomac.

There are a few small lakes among the mountains, but the state has no lakes of importance.

Scenery. The mountain valleys are beautiful, and where the streams have cut their way through the mountains, canyonlike gorges have been formed which are of special interest. The Valley of the Juniata is the most picturesque in the state. The Conemaugh and the Youghiogheny form gorges from 1200 to 1300 ft. deep, where they cut their way through the Chestnut Mountains. With the exception of the southeastern corner the state is so diversified by mountain, hill and valley as to make its scenery pleasing and attractive.

Climate. The mountains serve as a windbreak for the southeastern section, and give that part of the state mild winters, but the summers are hot. In the mountainous regions the winters are more severe, but the summers are cool. The mean temperature for January ranges from 18° to 37°; for July, from 65° to 76°. The annual rainfall ranges from 30 to 44 inches.

Minerals and Mining. Pennsylvania is the leading state in the production of coal, and contains deposits of both anthracite and bituminous coal. The anthracite fields are in the eastern part of the state, chiefly in Luzerne, Lackawanna, Schuylkill and Northumberland counties. Wilkes-Barre, Hazleton, Shenandoah, Ashland, Pottsville and Scranton are the great anthracite-mining sections. Here are found the largest anthracite mines in the world. The anthracite fields are about 2000 sq. m. in area, of which over 500 sq. m. are workable. The annual output from this region is about 78,000,000 tons, valued at about $200,000,000. About 170,000 men are employed in the anthracite industry.

The bituminous coal measures are in the southwestern part of the state, chiefly in Fayette, Westmoreland, Allegheny, Cambria, Washington and Jefferson counties. The area of these fields is about 15,000 sq. m. The annual output is about 152,049,486 tons, valued at over $200,000,000. Nearly one-half of this coal is used in the manufacture of coke, for which over 22,000,000 tons are produced annually. The bituminous coal industry gives employment to over 88,000 men.

Pennsylvania is the oldest state in the production of petroleum and the annual output is still important, being somewhat over 9,000,000 barrels. Because of its high grade, the Pennsylvania oil brings a higher price than that obtained from most other fields. The oil region is located in the western part of the state, and covers about 2000 sq. m. Natural gas is found in nearly all of the region west of the Allegheny Mountains and it is an important source of fuel for both domestic and manufacturing purposes. Pennsylvania contains over one-third the productive wells in the United States.

Iron ore occurs in the eastern, southeastern and western portions of the state, and mines are worked in all these localities. Pennsylvania is the leading state in the production of slate. Limestone and other rock suitable for building purposes occur in large quantities. There are extensive deposits of cement rock near Williamsport and other localities. Kaolin is found in Chester and Delaware counties. Fire clay and clay suitable for the manufacture of brick and tile are widely distributed. Sandstone for making glass abounds in the western part of the state. There are valuable deposits of feldspar in Chester County, and of phosphate rock in Delaware County.

Forests and Lumber. Formerly Pennsylvania was one of the leading states in the production of lumber, but as in other older states the most valuable forests have been exhausted. In the northern part among the mountains, large forests of hemlock are still found. Other woods of value are oak, white pine, poplar and spruce in the order named. The mines use large quantities of timber every year and lumbering is still an important industry, the annual output of lumber and timber amounting to over $30,000,000.

In 1901 a state preserve commission was created, and since then 500,000 acres of forest land have been acquired by the state for forest preserves. The commission is also taking additional measures to protect existing forests and to reforest regions from which trees have been removed.

Agriculture. Agriculture is one of the leading industries in the state. The farms are small; most of them are tilled by their owners, and diversified farming is generally practiced.

Soil. Except in the mountains, the soil is fertile and suitable for tillage, while much of that in the mountainous regions is adapted to grazing, so that the state has little barren land.

Products. The principal field crops in the order of their value are rye, corn, oats, wheat, buckwheat, potatoes and hay. Pennsylvania ranks first in the production of rye. Considerable tobacco is raised and in some sections raising garden vegetables is an important garden industry, while in other sections nurseries receive considerable attention.

Dairy husbandry is an important branch of agriculture throughout the state, and milk, butter and cheese are sold in large quantities. The state contains nearly 1,000,000 dairy cows, and the combined yield of the dairy products is about $36,000,000 a year. Raising poultry is also a good source of income and yields over $7,000,000 annually. About one-third of the farmers derive their greatest income from live stock, and cattle, horses, swine and sheep are found on most of the farms. Live stock finds a ready market in the mining and manufacturing centers.

Fisheries. The most valuable fisheries are those of the Delaware River, where shad and sturgeon are taken. The Susquehanna is next in importance, but the catch is much smaller than that of the Delaware.

Manufactures. Pennsylvania has for many years been the leading state in the production of iron and steel, and the annual output exceeds that of all other states combined. Fully one-half of this comes from Allegheny County. Pittsburgh is the largest center in the world in the manufacture of iron and steel. The other counties next in importance are Cambria, Lawrence, Westmoreland, Northampton, Chester and Washington. In 1917 the output of pig iron was 15,539,728 gross tons, and of steel, 15,940,901 gross tons. There is over $326,000,000 invested in the steel industry and the value of the yearly product exceeds $300,000,000.

The manufacture of textile fabrics ranks next to that of iron and steel. Pennsylvania is the first state in the Union in the manufacture of carpets and the second in the manufacture of silk, knit goods and woolen goods. Large quantities of cotton fabrics and of cotton yarn are also produced. The textile industries center in and about Philadelphia.

The Baldwin Locomotive Works, the largest of their kind in the world, are in Philadelphia, and large quantities of glass and machinery of all sorts are made in Pittsburgh. The manufacture of coke is also an important industry in the southwestern part of the state. The manufacture of tobacco products, clothing, carpets, leather, flour and grist-mill products, printing and publishing and shipbuilding furnish employment to a large number of people.

TRANSPORTATION AND COMMERCE. The northwestern part of the state has direct communication with New York by means of Lake Erie, the Erie Canal and the Hudson River. The Allegheny and the Monongahela rivers are navigable for about 60 m. The regions tributary to those streams have a water route down the Ohio to the Mississippi River, thence to the Gulf of Mexico. The Delaware River is navigable for ocean-going vessels to Trenton, and much farther for river-going steamers, and the Schuylkill is navigable for about six miles. The Delaware and Raritan and the Delaware and Chesapeake canals afford water communication with New York.

The Pennsylvania, the Baltimore & Ohio, the Erie, the Lehigh Valley, the Lackawanna & Western, the Central Railroad of New Jersey, the Lake Shore & Michigan Southern and the New York Central railroad systems all have lines within the state. In addition to these are many short lines either belonging to these systems or to others, making in all about 11,000 m. of steam railroads. Electric lines aggregate about 3000 m. Practically all of the railroads have lines leading into the coal regions, and these are used almost entirely for hauling coal. Except in the most mountainous regions railroad facilities are good, and there is no difficulty in transporting the products of the mine, farm or factory to market.

Pennsylvania is one of the foremost commercial states. The chief exports are coal, petroleum, iron and steel and their products, textiles, building stone, brick and tile, and such agricultural products as are not needed for local consumption. Iron ore and other raw material for manufactures are imported in large quantities. Other imports consist of foodstuffs and such manufactured articles as cannot be produced with profit within the state.

GOVERNMENT. The governor, lieutenant-governor, auditor-general, treasurer and secretary of internal affairs are elected by popular vote. Other important executive officers consist of the secretary of state, attorney-general and superintendent of public instruction, who are appointed by the governor. The governor's term is for four years. The Legislature consists of a Senate of 50 members and a House of Representatives of 204 members. Senators are elected for four years, one-half of the members retiring every two years. Members of the House of Representatives are elected for two years. The Assembly meets biennially in odd-numbered years.

The judicial department comprises a Supreme Court of seven judges elected by the people for 21 years; Superior Courts held in the judicial districts into which the state is divided; courts of Common Pleas and Quarter Sessions; and local courts in cities and towns.

EDUCATION. The school system is under the supervision of a superintendent of public instruction, who is ex officio a member and president of the state board of education, consisting of six members. Every township, borough and city is a school district, and the school system of each district is administered by a board of school directors, elected by the people. County superintendents are elected by the school directors of the respective counties. High schools are maintained throughout the state. The boards of school directors in any two or more adjoining school districts are permitted to equip and maintain joint elementary and high schools. The state maintains 13 normal schools, one in each of the 13 districts.

The Pennsylvania State College at State College is one of the land-grant colleges founded under the congressional

act of 1862. It received its present name in 1874. The United States Agricultural Experiment Station in Pennsylvania is a department of this institution. Other important institutions of higher education are the University of Pennsylvania at Philadelphia; the University of Pittsburgh at Pittsburgh; Dickinson College at Carlisle; Lafayette College at Easton; Lehigh University at South Bethlehem; and Haverford College at Haverford. At Carlisle there is a United States Industrial School for Indians.

State Institutions. The asylums for the insane are at Harrisburg, Danville, Norristown, Warren, Dixmont and Wernersville. The state maintains two schools for the deaf and two institutions for the blind and for the feeble-minded. The state penitentiaries are at Pittsburgh and Philadelphia. There is a house of correction and a house of refuge at Philadelphia, a workhouse in Allegheny County, a reform school at Morganza and an industrial reformatory at Huntingdon.

Cities. The chief cities are Harrisburg, the capital; Philadelphia, Pittsburgh, Scranton, Reading, Erie, Wilkes-Barre, Lancaster, Altoona, Johnstown, McKeesport, Chester, York and Williamsport.

History. Pennsylvania (Penn's Woods), so named for Admiral Penn by Charles II of England, was first permanently settled by Swedes on Tinicum Island, near Chester, in 1643. Stuyvesant captured it for the Dutch in 1655; Carr, for the English in 1664. In lieu of a debt of £16,000, Charles II granted it to William Penn in 1681. The following year Philadelphia was established, attracting by its liberal government, many of the persecuted of the Old World. Over 50,000 Germans and Swiss settled in Pennsylvania during the next 40 years. Independence Hall was built in Philadelphia, 1732-35. Though following a Quaker nonresistance attitude during the French and Indian Wars, Pennsylvania was the victim of many damaging raids, and at the close of the trouble, erected a line of forts from Delaware to Maryland. Mason and Dixon's line, 1767, settled the boundary dispute with Maryland. Pennsylvania was prominent in the Revolution. Not only was it the scene of many important engagements, but at Philadelphia, the war capital, the Second Continental Congress in 1776 adopted the Declaration of Independence, and in 1787, the Federal Constitution.

The Whiskey Insurrection occurred in 1794. The capital was changed from Philadelphia to Lancaster in 1799, and to Harrisburg in 1812. During 1806-17 the United States built the National Road. For the Civil War, Pennsylvania furnished about 365,000 men. It was the scene of Gettysburg. Its Soldiers' National cemetery shelters the graves of 3575 soldiers, who represent 18 states. In 1876 the Centennial Exposition was held at Philadelphia; in 1889 occurred the Johnstown flood; in 1892, the Homestead strike; and in 1902, the anthracite coal strike. George Grey Barnard's pieces of statuary, made for and placed in the new capitol in 1910, are considered the best work by an American sculptor. Consult Fisher's *The Making of Pennsylvania.*

Governors. Benjamin Franklin, 1776-1777; Thomas Wharton, Jr., 1777-1778; George Bryan, 1777; Joseph Reed, 1778-1781; William Moore, 1781-1782; John Dickinson, 1782-1785; Benjamin Franklin, 1785-1788; Thomas Mifflin, 1788-1790; Thomas Mifflin, 1790-1799; Thomas McKean, 1799-1808; Simon Snyder, 1808-1817; William Finley, 1817-1820; Joseph Heister, 1820-1823; John A. Schulze, 1823-1829; George Wolf, 1829-1835; Joseph Ritner, 1835-1839; D. R. Porter, 1839-1845; F. R. Shunk, 1845-1848; W. F. Johnston, 1848-1852; William Bigler, 1852-1855; James Pollock, 1855-1858; W. F. Packer, 1858-1861; A. G. Curtin, 1861-1867; John W. Geary, 1867-1873; John F Hartranft, 1873-1879; Henry M. Hoyt, 1879-1883; Robert E. Pattison, 1883-1887; James A. Beaver, 1887-1891; Robert E. Pattison, 1891-1895; Daniel

H. Hastings, 1895-1899; William A. Stone, 1899-1903; Samuel W. Pennypacker, 1903-1907; Edwin S. Stuart, 1907-1911; John K. Tener, 1911-1915; Martin G. Brumbaugh, 1915-19; W. C. Sproul, 1919—.

Pennsylvania, University of, at Philadelphia (1791). This university had its origin in a charitable school founded in 1740 and raised to the grade of an academy in 1751. In 1755 the academy was changed to the College and Academy of Philadelphia. During the turbulent times between 1760 and the close of the Revolutionary War, the institution continued with varying degrees of prosperity. In 1779 the Legislature of Pennsylvania, because of certain restrictions that had been imposed upon the College of the Church of England, made a new charter and placed all the rights and properties of the college with a new board, designated as the Trustees of the University of Pennsylvania. Ten years later the property was restored to the old board, and in 1791 an act was passed consolidating the old college with the new university under its present title. It maintains all departments usually found in a great university; it is heavily endowed and in addition receives aid from the state. It was the first American university to undertake systematic work in science, engineering and technology. All its departments maintain high standards. The enrollment exceeds 5200.

Penny, a British coin, since 1860 made of bronze and equal to $.0202 in United States currency, the 12th part of a British shilling. In the Byzantine Empire the penny was a silver piece; and in England, up to 1293, it was the only silver coin used. It then weighed 22½ grains troy. With a few exceptions it was the only English coin up to 1343. Up to the time of Edward I the English penny was stamped so deeply with a cross that it could be broken into parts, thus giving half pennies and farthings (four things).

Penobscot, *Pe nob' skot,* **River,** a river of Maine. It rises in Somerset County, near the Canadian boundary, and flows eastward into Piscataquis County, where a broad expansion forms Chesuncook Lake. From this lake it flows southward into Penobscot Bay. Its length is about 350 m. It is navigable for ocean steamers to Bangor about 60 m. from the sea, and above this point for smaller boats. It is an important waterway.

Pen"saco'la, Fla., a city, port of entry and the county seat of Escambia Co., 48 m. e. of Mobile, Ala., and 6 m. n. of the Gulf of Mexico, on Pensacola Bay. Railroads entering the city are the Louisville & Nashville, the Pensacola, Alabama & Tennessee, the Gulf, Florida & Alabama and others; and steamers ply between this and other ports of the United States and those of Europe and the West Indies. The harbor is landlocked and defended by forts Pickens, McRee and Barrancas, and is the most important deep-water harbor south of Hampton Roads. With the excellent rail and water facilities the commercial interests of the city are extensive and have helped to make Pensacola the second city (in size) in the state. The value of the foreign trade is approximately $25,000,000 annually. This revenue is derived chiefly from lumber, phosphate rock, tobacco, cotton and cottonseed oil, fish, meal and naval stores. The manufactures include fertilizer, turpentine, rosin, drugs, whiting and sash, doors and blinds. Other industrial features are the fine coaling docks and a grain elevator.

Pensacola has a delightful climate, with a mean annual temperature of 72° F. Its chief point of interest is the United States Naval Station, with shops, marine barracks, and an adjoining reservation containing a naval magazine, naval hospital and a National cemetery. The principal buildings of the city are the Federal Building, the city hall, the state armory, the opera house and the Brent, American National Bank, Thiesen and Blount buildings.

The first settlement which became permanent was made here in 1696 by a colony of Spaniards from Vera Cruz, Mexico. The place was captured by the

French in 1719, but again came into Spanish possession in 1723. It was captured by the British in 1763; and in 1781 a Spanish force under Governor Bernardo Galvez took possession. In the War of 1812 it gave assistance to the British, and was, therefore, taken by Gen. Andrew Jackson, who again captured it in 1818, because of the Spanish encouragement of Seminole Indian attacks; and in 1821 the United States took formal possession of Florida. In 1861 the Confederates seized the navy yard, but, being unable to take Ft. Pickens, evacuated the city the following year. The city was nearly destroyed by fire in 1864. Population in 1920, 31,035.

Pension, *Pen' shun,* an allowance annually of money settled upon a person, usually for services previously rendered. The United States early made provision for the payment of pensions to those who suffered in the military and naval service of the country. This was following the precedent established in Plymouth Colony in 1636, in which year the earliest pension act provided that any man permanently injured in military service in defense of the colony should be provided for during life, at public expense. After the Civil War the pension list grew to such mammoth proportions that there was a great deal of legislation on the subject. There were two acts passed at that period, in 1862 and in 1864. The first granted $8 to $30 per month for disabilities contracted in service dating from March, 1861. Provision was also made for pensioning widows and children of deceased soldiers, under 16 years of age. The law two years later provided fixed rates of payment for specific disabilities. This plan was developed by later amendments in great detail.

The most recent changes in the pension laws were made in 1900 following the Spanish-American War. It was then decided that any person who had served for at least 90 days in the army or navy and suffered permanent disability should be granted pensions ranging from $6 to $12 per month. By executive order of 1903, provision for which was made in the law of 1900, President Roosevelt placed upon the pension list every soldier and sailor who had reached the age of 62 years. The act of 1908 added many more dependents, including nurses, invalids and helpless children. In addition to pensions the United States grants gratuities in the way of retention in all civil service positions and national soldiers' homes, besides aiding certain of the states in the maintenance and education of soldiers' orphans until they attain the age of 16 years.

For the administration of the pension system an independent bureau was created in 1833, but since 1849 it has been a bureau of the department of the interior. From 1865, the close of the Civil War, to June 30, 1908, the end of the fiscal year, the total disbursement amounted to $3,751,108,809. The money appropriated by Congress for the payment of pensions was formerly disbursed by 18 pension agencies distributed throughout the country, but in 1912 Congress abolished these agencies and authorized that the work be performed by disbursing clerks in the pension bureau. This Congress also increased the pensions to soldiers of the Civil War, the maximum being $30 per month.

Old-Age Pension. In England an old-age pension bill was passed by the House of Commons in July by a vote of 315 to 10, to become effective Jan. 1, 1909. All persons at least 70 years of age who are citizens of the United Kingdom and have resided there during the 20 years preceding and do not belong to the delinquent, defective or criminal classes and who are not public dependents come under its provisions. It provides for a sliding scale of pensions, the amount granted depending on the income from other sources. The largest pension is 5 shillings per week to all qualified persons who have not more than 21 pounds income per year. Pensions of 4, 3, 2 and 1 shillings per week are granted to higher income classes. Persons having more than 31 pounds, 10 shillings income per week, get no pension. This is a supplement to the small incomes of aged but

respectable working folk. The post office is utilized in distributing the pensions.

In the United States several attempts have been made to secure the passage by Congress of an old-age pension act that will apply to the government employees under civil service regulations. Many railroads and other large corporations in the United States retire their employees on part pay when they reach a certain age, the limit varying from 60 to 70 years.

Teachers' Pension. In Germany public school teachers are retired on a pension when they reach the specified age. In the United States the movement to pension teachers has practically developed since 1900. Rhode Island, Maryland and New Jersey provide pensions from funds created from a small percentage of the teachers' salaries. Chicago and other cities have pension systems in successful operation. A number of states have enacted legislation for the purpose of providing pension funds. The regulations usually require 20 to 25 years of service to entitle a teacher to a pension.

Pentateuch, *Pen' ta tuke,* the name applied to the first five books of the Bible, *Genesis, Exodus, Leviticus, Numbers* and *Deuteronomy,* considered as one group. The Hebrews considered this portion of the Old Testament as the *Book of the Law.* Whether Moses, the reputed author of the Pentateuch, wrote the five books, or whether they are the production of different writers, is a subject of controversy. Modern scholars regard the book of *Joshua* as a part of this group, to which they give the name Hexateuch.

Pen'tecost, the Greek name of the second of the three great Hebrew festivals, in the Old Testament commonly called the Feast of Weeks. Pentecost was celebrated seven weeks after the second day of the Passover, as a period of thanksgiving for the ingathering of the harvest. In the Christian Church Pentecost commemorates the descent of the Holy Ghost on the disciples, after the Ascension of our Lord. The English name of the festival, Whitsunday, comes from the white robes worn by the newly baptized. The observation of Whitsunday falls on the seventh Sunday after Easter, and the whole time between Easter and this day is observed in the Roman Catholic Church with great solemnity.

Pe'ony, or **Pæony,** a showy, ornamental herb of the Crowfoot, or Buttercup, Family. It is a dooryard plant with slightly woody stems and pointed, much-divided leaves. The flowers are large white or colored blossoms that are in bloom throughout the summer; they are usually very double. All except the flowers of the Chinese peony, which are rather sweet-scented, have an unpleasant odor.

Peo'ria, Ill., a city, port of entry and county seat of Peoria Co., 150 m. s.w. of Chicago, on the lower end of Peoria Lake, an expansion of the Illinois River, and on the Chicago, Burlington & Quincy, the Illinois Central, the Chicago & Alton, the Chicago & North Western, the Cleveland, Cincinnati, Chicago & St. Louis, the Chicago, Rock Island & Pacific, the Iowa Central, the Lake Erie & Western, the Vandalia and other railroads. The Illinois River is navigable to its mouth, and at La Salle, above Peoria, connects with the Illinois and Michigan Canal. A number of bridges span the river at this point. There is an excellent street-car system, and interurban lines connect with the Peoria & Pekin Union and with the Peoria & Pekin Terminal. Peoria occupies an area of nearly nine square miles and is situated in a fertile agricultural region. The city is built on a plateau above the river, the residential portion being on bluffs overlooking the lake. Peoria is the second largest city in the state and is an important commercial center, controlling a large trade both by rail and river.

The streets of the city are broad, well paved and shaded, and attractive boulevards connect the sections of the park system, which embraces over 400 acres. The handsome residences and suburban homes are surrounded by lawns and gar-

dens. The largest of the city parks is Bradley Park of 140 acres, which was given to the city by Mrs. Lydia Moss Bradley and named in her honor. Other parks include Glen Oak, Madison and South parks. In the courthouse square there are two monuments in honor of the soldiers and sailors of Peoria County who perished in the Civil War. In Springdale cemetery there are two similar memorials and a monument erected by the state to mark the grave of Thomas Ford, governor of Illinois in 1842-46.

The principal public buildings include a courthouse, Federal Building, city hall, theaters, clubhouses, a large number of banks, several convention halls, substantial business houses and about 84 churches, many of them of handsome architectural design and interior beauty. The educational institutions include the Bradley Polytechnic Institute, affiliated with the University of Chicago, the Spalding Institute, Sacred Heart Academy, Conservatory of Music and the public and Peoria Law libraries. There are new and modern grade-school buildings costing over $200,000 each; two high schools and many kindergartens. Among the benevolent and charitable institutions are the Guyer Memorial, Bradley and John C. Proctor homes for the aged, Proctor, Deaconess and St. Francis hospitals, Home of the Good Shepherd, Florence Crittenton Home, Lutheran Orphans' Home, an industrial school for girls and Home for the Friendless. A state hospital for the incurable insane is located in Bartonville, a suburb of the city.

Peoria ranked first in distillery products among the cities of the United States. These distilleries paid into the government treasury the largest internal-revenue tax of any revenue district in the Union. The city is also the center of an enormous grain and coal trade and has extensive manufactories of agricultural implements, wagons and carriages, glucose, automobiles, strawboard, wire fence, starch, furniture, coffee roasters, paper, foundry and machine-shop products, brick, flour and gristmill products. There is an extensive slaughtering and meat-packing industry. Large quantities of carp are caught in the Illinois River and shipped to Eastern markets.

Peoria was named from an Illinois tribe of Indians. In 1680 La Salle visited the site of Peoria and on the opposite side of the river in Tazewell County built a fort called Ft. Crèvecœur. After the fort was abandoned the place became a center for traffic in furs. Peoria is built on the site of Ft. Clark, which was burned in 1818. In 1835 Peoria was incorporated and in 1845 was granted a city charter. Population in 1920, 76,121.

Pep'per, a family of herbs, climbing shrubs or even air plants. All are tropical plants, native in the East Indies but cultivated in the tropics everywhere. The source of our condiments, black and white pepper, is a climbing shrub which lifts itself by tiny rootlets upon the poles set as supports. These poles are generally arranged in such a way that the pepper plants may be shaded, or they are cuttings from quickly rooting plants which will bear leaves and so protect the young vines. The stems of the pepper are vinelike, with swollen joints where the leaf stems branch, and in flowering, the leafstalks and a flower stalk are put forth on each side of this joint. The leaves have broad bases, pointed apexes and deep veins. The flowers are without petals or sepals and are merely groups of greenish balls which ripen into globular, fleshy fruits, called peppercorns. These fruits when picked unripe and dried become black and hard and are the black pepper of the market. When allowed to ripen the fruit becomes bright red. These, dried and ground, form white pepper. A variety of peppers whose fruit has a stalklike projection produces the drug known as cubeb. All peppers have a sharp, biting taste, and their exhalations are irritating to the nostrils, lungs and throat.

Pep'perell, Sir William (1696-1759), an American soldier, born at Kittery, Me., then a part of Massachusetts. In 1726 he was in the Massachusetts General Court; in 1727 became a member of

the governor's council, which he headed for eighteen years; and in 1730 became chief justice of the Court of Common Pleas. Having lent £5000 towards the enterprise, he was made commander-in-chief of the expedition against Louisburg, which, aided by a British fleet under Commodore Warren, he forced to capitulate after a siege of several weeks, June 17, 1745. In consequence Pepperell was knighted by George II, being the only New Englander thus distinguished. In 1749 he visited England. At the outbreak of the French and Indian War he was active in raising troops, became a major-general and commanded the defenders along the New England borders. Later he was acting governor of Massachusetts for two years.

Pep'permint, a common, rapidly spreading weed of the Mint Family, brought to the United States to be used medicinally, and still cultivated for the production of oil of peppermint, greatly valued as flavoring for candy and for its curative properties. It is a highly aromatic, square-stemmed herb, growing to a height of from one to two feet. The leaves, which are somewhat oval, with acute points and long stems, are unlike those of most mints in being smooth. The flowers grow in small clusters and the individual blossoms are small and bluish-white in color; when closely examined they are seen to have tiny tubular corollas which at the margin are divided into two somewhat unequally-divided lips. The oil for which the plant is cultivated is produced in glands near the surface of the leaves and is procured by means of pressure and distillation. Peppermint distilleries were first built in America in northwestern New York, but the soil of Michigan was found to be so well adapted to the growth of the plant that now fully three-fourths of the peppermint oil used in the United States is produced and distilled in southern Michigan.

Wild peppermint, an escape from these fields, is found along damp meadows or by roadsides where the soil is rich and moist. It flowers all summer.

Pepys, *Peeps,* **Samuel** (1633-1703), an English diarist, celebrated for his unique *Diary* continuing for about nine years, and first published in 1825. It gives an accurate picture of the court of Charles II, as well as of the age as a whole, and is one of the most individual "human documents" in the English language. In 1673 he was appointed secretary for the affairs of the navy, and was diligent in the performance of his official duties. He also wrote *Memoirs of the Royal Navy.*

Pequot, *Pe' kwot,* **War,** a war between the white settlers of New England and the Indians, 1636-1637. Though it concerned all the colonies, Connecticut received the brunt of the trouble and thereby was almost annihilated. While Massachusetts and Plymouth were hesitating, John Mason of Windsor, Conn., a daring soldier who had seen service in Netherlands, with John Underhill of Massachusetts Bay, led an organized company of some 300 against the main stronghold of the enemy. An attack of May 20, 1637, practically exterminated the Pequots. The Pequots were of Algonquian stock.

Perception, *Per sep' shun,* the interpretation of sensations by means of the mind. It is the state of consciousness in which we make use of old experiences by fitting them into their proper relations in the mind. Our perceptions are formed by means of the comparisons that are constantly being made, as when we discover that one berry is sweeter than another or that one color is red and another blue. We can perceive these relations because we are able to hold the first impression in mind until after the second has been received; after the consciousness has journeyed, as it were, from one to the other, it is able to turn back and survey the course over which it has traveled. A perception is the result.

These perceptions are qualitative or quantitative; if qualitative, they distinguish first between dissimilar impressions, as the sight of a building and the sound of a bell; later they become more discriminating and enable us to distin-

guish between shades of the same color or sounds of different timbre. Quantitative perceptions are at first wholly numerical, as the child recognizes *two* blocks and *four* blocks before he recognizes that in one case he has twice as many as in the other.

Our training in compound sense perceptions is apt to be so limited that the ability of a person so trained seems little short of marvelous. Thus the professional tea taster recognizes immediately the differences between two grades of tea, which to the ordinary individual seem exactly alike, and a tobacco expert can detect by odor and feeling the value of two leaves of tobacco that are identical to the untrained person. Few of us can estimate time intervals accurately, distinguish shades of color or recognize the interval of two musical tones, and yet without doubt new worlds are open to those who can. Simple exercises in observation and comparison of color, weight, sound, etc., enable a person to cultivate the ability of forming rapid and accurate perceptions, a valuable asset in any sphere of life.

Perch, a family of fresh-water fishes of the Northern Hemisphere and recognized by their long, round bodies, many vertebræ and small, rough scales. Two genera, the pike perch and yellow perch, are important to the angler and are tenacious strugglers when caught. All are fresh-water fish found in almost all American lakes and streams, where they seem to prefer clear water and a sandy bottom. The pike perch has innumerable local names, such as wall-eyed pike, yellow pike, glass-eyed pike, salmon, jack salmon and pickerel. The yellow perch is of brighter color, has a shapely body, long head and projecting jaws. The back is somewhat elevated but on the whole it is well-proportioned. In the Great Lakes and tributary waters large schools are found and are easily taken by anglers.

The dwarf perches are smaller and still brighter in color. Because of their sudden, swift movements, made by a strong sweep of their pectoral fins, they are generally known as darters. They are also given to moving their heads from side to side as if from curiosity or fear. Because of their small size, darters, though of pleasing flavor, are not important as food fish. The Sacramento perch, a Western fish, belongs to the Sunfish Family, as does also the Warmouth perch of the Mississippi Valley. The white perch, an esteemed food fish because of its white, firm flesh, is a bass, and is found in eastern United States, where it is as frequently known as the American perch.

Père Hyacinthe, *E″ a″ sant′*. See LOYSON, CHARLES.

Per′fumes, the delicate odors arising from certain volatile substances used for toilet purposes. The making of perfumes was common among the Assyrians, Babylonians, Egyptians, Phœnicians and the people of Palestine. There are two classes of perfumes: those derived from an animal source and those of vegetable origin; and they are known to the trade as crude and prepared. The crude perfumes derived from animal sources are musk, civet, castor and ambergris. Prepared perfumes are obtained from the essential oils of certain plants and flowers, and the oils are prepared chiefly by distillation (See DISTILLATION). The violet, rose, tuberose, sandalwood, cedar, sassafras and other woods; the lemon, orange and bergamot among the fruits; dill, caraway and anise among the seeds; clover, nutmeg and cinnamon among the spices; and numerous herbs, gums and roots are all used as sources for vegetable perfumes. In extracting the perfumes from flowers the process known as *enfleurage* is used. This consists in placing the flowers in a tight glass box whose sides are covered with tallow or lard to the thickness of about half an inch. Within 24 hours the grease absorbs the odor; the flowers are then replaced by fresh ones, the process being repeated until the grease is thoroughly saturated with the essential oil, which is then obtained by melting and distilling.

In the manufacture of perfumery, musk is very largely used, since it has

the most permanent scent, and is frequently blended with other odors in order to hold them; while ambergris forms the body of many crude perfumes. Chemical research has so improved the methods of making essential oils that the business is divided now into two distinct branches. One branch makes the crude perfumes, while others complete the preparations that are sold to the users. The attar of roses, as made by the Turks from selected rose petals, is the most expensive perfume, selling often as high as $80 an ounce, but chemists are able closely to imitate this and the essential oils, as well as the crude perfumes. The manufacture of perfumes is an extensive and important industry in France, Germany, England and along the coast of the Mediterranean. Recently in the United States there have been produced some very excellent perfumes, comparing well with the best of those made in Europe. See ATTAR OF ROSES; VIOLET; HELIOTROPE; HYACINTH; ROSE; PINK.

Pericardium, *Per" i kar' di um.* See HEART.

Pericles, *Per' i kleez,* (about 495-429 B. C.), one of the most famous statesmen of Athens, who, though a member of the aristocracy, stood for the rule of the people. He was educated by the foremost teachers of his times, and at his entrance into public life announced himself as leader of the Popular Party. He defeated the leader of the opposing party, Cimon, who was ostracized. His rule constituted the most glorious period in the history of Athens (See ATHENS, subhead *Age of Pericles*), for he wished to make Athens the leading state of Greece. In this he was opposed by the jealousy of Sparta, and as a result the Peloponnesian War began in 431 B. C. In the second year of the war a plague broke out in Athens, proving most disastrous to the city, for by it Pericles lost his two sons and later fell a victim himself. His policy of holding entire control of the state proved to be unfortunate for Athens, since upon his death there was no great leader to succeed him. He brought about several reforms, among which were the payment of soldiers and citizens in public office and the free admission of poor citizens to the plays given at the Theater of Dionysius.

In personal appearance Pericles was graceful and dignified; he had a high forehead, full lips and a straight Grecian nose. His power of oratory was great and his words and manner convincing; and he left upon his people permanent impressions in the high ideals and lofty standards which he himself advanced.

Peripatetic, *Per" i pa tet' ik,* **School of Philosophy.** See ARISTOTLE.

Per'jury, in law, the crime of knowingly and willfully giving false testimony in a judicial proceeding and when the witness is under oath or affirmation. A mistake on the part of the witness or a misstatement made through inadvertence is not perjury. On the other hand, if he recklessly and knowingly makes a statement as to the truth or falsity of a fact of which he has no knowledge, it is considered perjury. Subordination of perjury consists in procuring another to commit perjury. In the United States and England perjury is punished by fine and imprisonment or both. In some states one convicted of perjury cannot thereafter give testimony in court.

Pernambuco, *Per" nam boo' ko,* a city of Brazil, capital of the State of Pernambuco, situated on the Atlantic coast. Recife, the oldest of the three parts, lies on a peninsula; São Antonio, on an island between a reef and the mainland; Boa Vista, on the mainland. The business of the town centers in Recife. In São Antonio are the large public buildings, and Boa Vista contains the finest residences, attractive gardens and broad streets. The public buildings, including the churches, educational and charitable institutions, are large and numerous. Prominent are the law school and a good secondary college. The trade of Pernambuco is extensive and it now ranks second in Brazil in point of commercial importance. The harbor is protected by a reef, through which are cut navigable passages for smaller vessels. Its extreme eastern position places the city in

the path of the bulk of the South Atlantic commerce. The chief exports are cotton, sugar, skins, rum and forest products. The manufactures embrace machinery, cotton, leather and glass. Pernambuco was founded by the Portuguese in the 16th century and was held by the Dutch from 1630 to 1654. Population in 1902, including the suburbs, 200,000.

Perrault, *Pĕ" ro',* **Charles** (1628-1703), a French author, born in Paris. His best-known works are the *Mother Goose Stories,* the nursery tales which he gained from oral tradition and published under the name of his son. They include the charming stories of *Cinderella, Sleeping Beauty, Little Red Riding Hood, Blue-Beard, Tom Thumb* and *Puss in Boots.* Less valuable are his comedies, studies and his *Mémoires.*

Perry, Matthew Calbraith (1794-1858), an American naval officer, brother of Oliver Perry, born in Newport, R. I. He entered the navy in 1809, served during the War of 1812, fixed the locality of Liberia, commanded against West Indian pirates, was in command of the Brooklyn navy yard, superintended constructing the *Fulton* and in 1841, as commodore, commanded it in suppressing slave trade. In 1847 he engaged in the siege of Vera Cruz, and in 1852-53 made his famous expedition to Japan, negotiating the treaty whereby Japan's commercial possibilities were awakened. His flagship was the first American vessel to circumnavigate the globe.

Perry, Oliver Hazard (1785-1819), an American naval officer, born at South Kingston, R. I. He entered the navy as midshipman in 1799, served against the Barbary pirates, and during the War of 1812 had chief command on Lake Erie. There he fitted out a squadron of one brig, six schooners and one sloop, with which, having nine vessels all told, he appeared off Amherstburg to meet the British Captain Barclay, who had six vessels, with 63 guns and about 460 men, including officers. The Americans had 54 guns and 490 officers and men. In a hot engagement on Sept. 10, 1813, Perry lost four-fifths of the crew of his flagship, the brig *Lawrence,* which was so shattered that he had to abandon it. Finally, however, he completely defeated the British, and his message to General Harrison to that effect was: "We have met the enemy and they are ours—two ships, two brigs, one schooner and one sloop." For this victory Perry was made captain and awarded a gold medal. After having commanded the *Java* in the Mediterranean, 1815-1816, he died of yellow fever in Trinidad, where he was buried. Later his remains were taken to Newport, R. I., where a statue to him was erected.

PERSEUS

Persep'olis, the Greek name of the capital of Persia under Darius I and his successors. The only remains of the city are the ruins of structures scattered throughout the Valley of the Polvar, near Shiraz. They consist of three main groups, most important of which is the "Throne of Jemshed."

Persepolis was surrended to Alexander the Great following the Battle of Gaugamela (331 B. C.), after which it gradually declined.

Perseus, *Pur' sus,* in myths, a Greek hero, son of Jupiter and Danaë. In order to frustrate the oracle that he should die by the hand of his grandson, King

Acrisius of Argos, father of Danaë, had confined her in a brazen tower, far from the sight of man. Jupiter, however, changed into a shower of gold, entered her prison and won her love. When Acrisius learned of the birth of a grandson, Perseus, he put mother and son into a chest which floated out on the waters to the Island of Seriphos. Here they were rescued and kindly treated. When Perseus attained manhood, the ruler of the place, Polydectes, wishing to marry Danaë and to get her son out of the way, sent him in search of the Gorgon's head. Equipped with Pluto's helmet, which made him invisible, with Mercury's sandals and sword and with Minerva's shield, Perseus killed the Gorgon, Medusa. Later the hero turned Atlas into stone (See ATLAS), rescued Andromeda (See ANDROMEDA) whom he wed, and turned Polydectes, who had been tormenting Danaë, to stone. With her and Andromeda, he then returned to Argos, where, in a game of quoits, he one day accidentally killed his grandfather. Thus the early prophecy was fulfilled.

Pershing, Gen. John Joseph (1860-), an American soldier. Born at Laclede, Missouri, graduated at West Point in 1886. He saw service in several Indian outbreaks and was in the Santiago campaign of the Cuban War. He was transferred to the Philippines, commanding the forces in Mindanao. Afterwards he was military attache to thee American embassy at Tokio and was with Kuroki in the Russo-Japanese war. Then he was stationed at the Preside in San Francisco, and there his wife and three daughters were burned to death in 1915. He was in command of the punitive expedition into Mexico in 1916. In 1917 he was appointed General in command of the American Expeditionary Force in France and as such all important movements of our soldiers in France were under his general supervision.

Persia, *Pur' sha,* a country of southwestern Asia bounded upon the n. by Transcaucasia, the Caspian Sea and the Transcaspian provinces of Russia; on the e. by the southern provinces and Afghanistan and Baluchistan; on the s. by the Persian Gulf, the Straits of Ormuz and the Gulf of Oman; and on the w. by the long strip of Asiatic Turkey. The country is roughly rectangular in shape, having a greatest length of 900 m. from east to west and a greatest width of 700 m. from north to south. Its area is 628,000 sq. m., or about one-sixth that of the United States.

PHYSICAL FEATURES. Persia consists chiefly of a great plateau from 2500 to 3500 ft. in height, surrounded except at the east by lofty mountains, whose outer slopes stretch by gradual descent to the boundaries of the country. The plateau seems to have been a region of low, irregular mountain systems whose separating valleys have been filled by soil washed from the slopes. The eastern part is a broad desert forming at the north the great salt Desert of Khorassan, famous for its rock salt, and at the south the sand desert of Kerman; low mountains lift their heads above these deserts, giving them an uneven roughened surface. On the southern slopes of the encircling mountains the climate is hot and dry and unbearable for habitation. At the west it is also hot, but there frequent rains occur and the land is swampy. The beautiful part of Persia is at the north. Here are the mountains which extend from the Hindu Kush range at the east to the farthest limits of Persia at the west. The range south of the Caspian Sea is called the Elburz Mountains. Their northern faces are beautifully wooded, cut by fertile valleys and snow-capped peaks. Mt. Demavend, the highest of the range, is a volcanic peak over 18,000 ft. in height, and Mt. Ararat, of Bible fame, also a volcanic peak, is nearly 17,000 ft.

Persia has but one navigable river, the Karun, a tributary of the Tigris. The Aras, Kizil Uzen and Gurgan flow toward the Caspian and succeed in breaking through the mountain wall; the others are lost in the sands of the desert. The Shat-el-Arab and the Bendemir, immortalized by Tom Moore, are the southern rivers. Persia has over 30 salt lakes.

PERSIA

PRODUCTIONS. At the south Persia is practically barren, although plantations of date palms are found in some sections. On the plains, sugar cane, oranges, pomegranates, mulberry trees, cotton, grapes and orchard fruits flourish. Rice, madder and tobacco grow in scattered localities. Persia is remarkable for its profusion of fragrant flowers; roses grow everywhere, climbing naturally over roofs, walls and ancient ruins. The mines of Persia might yield great wealth, but, owing to poor means of transportation and the indifference of the people, mining is not extensively carried on. Lead, copper, iron, silver, tin, antimony, arsenic, nickel, cobalt, sulphur and coal are known to exist. The last and salt are the only ones that are of commercial importance at present.

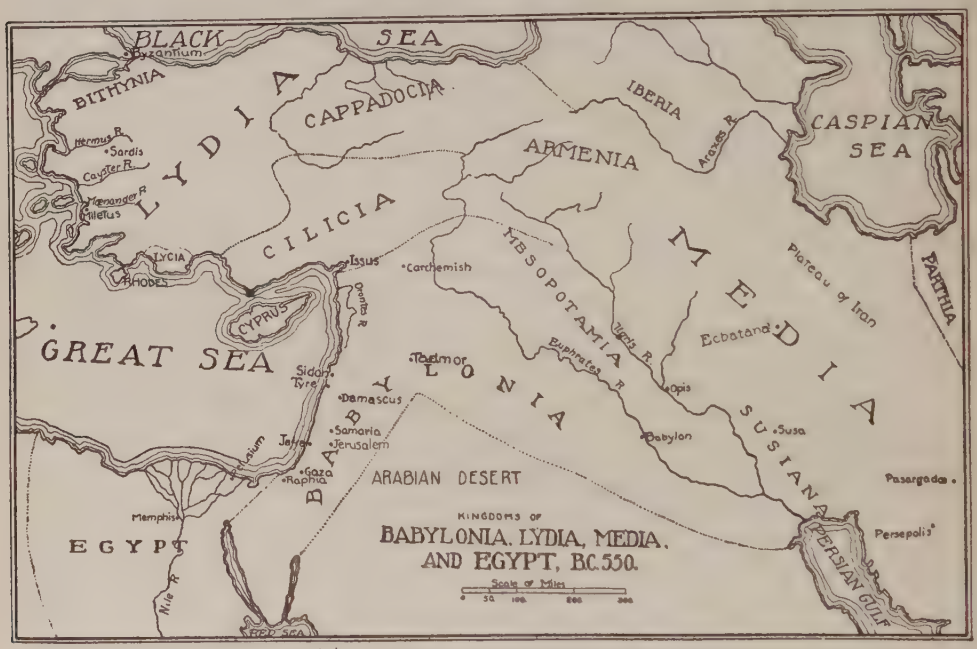
INDUSTRIES. Persia is a country of artistic manufactures. Taffetas, velvets and brocades of excellent quality, carpets, rugs and shawls made from wool of the native goats, swords, hammered copperware, gold brocades and felt, all form products of this interesting country. Its great carrying trade is still kept up by means of long caravans of mules and camels over roads impassable to other burden-bearers. These long trains carry silk, gold, silver, pearls, turquoises, dates, lemons, dried fruits, rice, raw cotton and cocoons from Tabriz, Teheran, Ispahan and the inland regions to the ports of Bender Abbas, Lingah and Bushire, on the Persian Gulf, and to Enzeli, Neshed-i-Ser, and Bender-i-Gez, upon the Caspian; thence they return with cotton and woolen goods, sugar, tea, coffee, drugs, glass, hardware and petroleum. The sea and gulf commerce is carried on almost entirely by the Russians, British, Indians and Armenians.

PEOPLE, RELIGION AND EDUCATION. The Persians are historically an important branch of the Iranian group of Aryans. The pure Persian type is still represented among the Farsis about Persepolis and the Luris, or mountaineers, at the west. Aside from these there are: at the southwest a darker race resulting from an intermixture with Arab neighbors; the Hajemis and Tajiks, the most numerous and a cross between the Turkoman-Tartars and pure Iranians; and the Susians, who seem to have a strain of Indian blood. The people are of varying grades of civilization, from the highly cultured, aristocratic people of the north to the barbarians and nomadic peoples of the mountains and plains. Until recently their glory was of the past rather than of the present. The Persians as a whole are a hospitable, courteous people and friendly toward foreigners. Their home life is remarkably charming, and the mother, the grandmother and the mother-in-law are the most highly respected members of the family. Procrastination and the lack of any conception of time are their chief faults. They are a cleanly people and dress generally in white or in richly embroidered garments, which vary according to the occupation of the wearer. The women are small and are zealous followers of fashion. In religion they are chiefly of the two great branches of the Mohammedan faith. There are some Jews, Protestants and Catholics. Primary schools are very common but are all private institutions, and in many families private tutors are employed. Science is neglected, but religion, literature, art, law and logic are familiarly studied. Recently a minister of education has been made a member of the cabinet and is aiming to unify the school system.

GOVERNMENT. Up to 1906 Persia was an absolute monarchy. The shah, whose official title is Shahinshah, or "King of Kings," was ruler over the lives and property of his subjects. Because of this the rulers were ordinarily wealthy, and the jewels of the shah form a notable collection. In conformance with their religion, the Persians considered their ruler the vice-regent of Mohammed. At the beginning of the 20th century the spirit of democracy had begun to arise in this Eastern country, and in response to demands, which in 1905 grew too insistent to be disregarded, the ruler consented to the establishment of a National Council; this council was to be

elected by the members of the imperial family, clergy, chiefs, nobles, landowners, merchants and tradesmen. All matters of State, such as the ratification of treaties, territorial changes, etc., require the consent of the council. A Senate of 60 members, 30 of whom were to be appointed by the shah and 30 elected, was also provided for but was never actually formed. The cabinet consists of seven members.

Persia is divided into 33 provinces, each headed by a governor-general directly responsible to the shah. Most of these governors have a vizier who acts as adviser and treasurer. The chiefs of the nomadic tribes are under the governor of the province in which they live.



PERSIA AT THE TIME OF CYRUS THE GREAT

History. When first known to other nations, Persia was a comparatively small territory whose inhabitants seem to have come from still farther east before the eighth century B. C. As early as 630 B. C. they became subjects of the Medes, with whom they are commonly united in Biblical history. In 558 B. C. Cyrus, subsequently known as Cyrus the Great, rebelled against the Median conquerors, vanquished them and in a few years had added to his domains Babylonia and all Asia Minor (See Cyrus the Great). Later, during the reign of Cambyses, the son of Cyrus, Egypt also became a Persian possession, and in the next three reigns Armenia, Afghanistan, northwestern India and the land from the Black Sea to the Greek Peninsula all fell into the hands of this seemingly unconquerable nation. The rise of this obscure nation to a great world power in scarcely more than a generation is partly due to skillful use of weapons and to the generalship of their leaders. These leaders also showed remarkable statecraft in governing their possessions and skill in building up a magnificent empire. From 492 B. C. to 479 B. C. Persia was engaged in a struggle with Greece in which the forces of Xerxes, the Persian ruler, were defeated. The turning point of Persian history had come; to the Western land went the supremacy that had been Eastern (See Athens, subhead *Persian Wars;* Xerxes). After the as-

sassination of Darius and the victory of Gaugamela (Arbela), 331 B. C., Alexander the Great considered himself the head of Persia and made it a part of his great world empire (See ALEXANDER THE GREAT). At his death it was divided, and the country, though chiefly under Greek influence, was envied by Rome and by the various tribes that at different times became powerful.

By the seventh century A. D. a new power had arisen in the East. In 650 the Arabs had penetrated to every part of the Persian Empire, and the religion of the country became fixedly Mohammedan. Through the succeeding centuries Persia was variously held by Mongols, Turkomans and Turks. In 1500 Ismail Sufi, pretending to be a descendant of Ali, the son-in-law of Mohammed, made himself ruler and was the first to adopt the title of Shah. From the time of Ismail, Persia was in a constant state of defense against Turkey. In 1795 Agha Mohammed, a Turkoman, founded the present dynasty of Persian kings. His nephew, Futteh Ali, succeeded him in 1799 and soon engaged in an unsuccessful war with Russia, ending in the Treaty of Gulistan (1813), by which Russia gained several provinces and the right of navigating the Caspian Sea. As the result of another war in 1826, Russia won Armenia from Persia. Nasr-ed-Din, whose reign began in 1848, found a disturbed country. He established himself firmly and had begun his plan of expansion into Baluchistan and Afghanistan when he was checked by Great Britain with troops from India. In 1896 he was succeeded by his son, Muzaffar-ed-Din, who did away with the office of grand vizier and carried out some important reforms. Taxes on food were lessened, the civil service was improved and revolts were promptly put down.

In 1906 the discontent in Persia crystallized in the demand for a representative form of government. The demand was ostensibly granted but so poorly carried out that a band of revolutionists, who called themselves nationalists, marched upon Teheran in 1909 and demanded the abdication of the Shah. A provisional government was immediately formed, and an American, W. Morgan Shuster, was asked to take charge of Persia's financial affairs (See SHUSTER, WILLIAM MORGAN). In the meantime Great Britain, whose interests in Baluchistan and India have made her a neighbor at the southeast, and Russia, whose provinces adjoin Persia at the north, entered into an agreement whereby Russian influence was to be limited to the Persian territory on the Russian frontier and British influence should similarly be confined to her frontier. Between these two was to lie a Twilight Zone in which each country might seek concessions. The two countries agreed to respect the integrity of Persia, but, without Persia's consent, they planned to exercise a dual protectorate over the country's affairs. In 1911 Russia objected to Mr. Shuster's efforts to collect certain taxes from the brother of the late Shah and demanded from the Persian Government the dismissal of Shuster and an apology from Persia for insulting language used to Russian consular officials. Although Mr. Shuster's work had proved admirable, Russia's threat of armed entrance into the country forced Persia to accede to the demands of the superior power, and Russian troops remained stationed in northern Persia. Population, 9,500,000.

Persian Gulf, an arm of the Arabian Sea, separating Persia from Arabia. The Strait of Ormuz connects it with the Gulf of Oman. It is 520 m. long and from 150 to 200 m. wide, and has an area of about 90,000 sq. m. There are numerous islands, with a territory of 1400 sq. m., the greater number being desolate and barren. The most important are Kishm, Ormazd and the Bahrein Islands; the pearl fisheries of the latter are important. The Euphrates and Tigris rivers combine to form the Shat-el-Arab, and empty their waters into the gulf.

Persim'mon, a fruit-bearing tree of the Ebony Family which produces a plumlike fruit also known as persimmon. The tree has a hard, firm wood, bears

oblong leaves and small, white, bell-shaped flowers. The fruit, which is yellow when ripe, before maturity contains a large quantity of tannin that renders it bitter and puckery to the taste. As it ripens, the tannin becomes insoluble and so tasteless; the fruit is then sweet and palatable. Recently the United States Government, following experiments first tried in Japan, has found that surrounding the ripening persimmons with an atmosphere of carbon dioxide tends to produce a nonastringent persimmon that may be pared and eaten like an apple. The method is beginning to be used in the United States on a commercial scale and is called "processing persimmons." Persimmons are raised chiefly in Japan, southern Europe and the Southern States of the United States.

Per'sonal Prop'erty, or **Per'sonalty,** that property which is distinguished from real property or real estate. A man's farm is real property, but his live stock, farm implements, household furniture, etc., are personal property. In general, all property not in the form of houses and lands is personal property. Usually personal property can be transferred by mutual agreement of the parties to the transaction, whereas real property can be transferred only by written contract. Real property can be inherited, but at the death of the owner personal property passes to the administrator for disposal.

Perspira'tion, a transparent, colorless liquid poured out upon the skin through the minute glands terminating in pores. It has a peculiar odor, which varies in individuals and in races. The amount of sweat secreted varies, but it is usually from 25 to 71 ounces in 24 hours. Ordinarily the moisture evaporates as fast as it is secreted; but overheating, due to vigorous bodily exercise or high surrounding temperature, frequently causes a profuse flow, which collects on the surface in drops, usually on the brow, soles of the feet and in the palms of the hands. In the former case we have insensible perspiration; in the latter, sensible perspiration. The activity of the sweat glands is controlled by nerve fibers, not by blood stimulation, as was formerly supposed. The impurities carried off in the perspiration of a normally healthy person are uric and fatty acids, common salt and other salts. See SKIN.

Perth, the capital of Western Australia, situated on the Swan River, 12 m. by rail from Fremantle. Features of interest include the Parliament Buildings, government offices, the town hall built entirely by convicts, the Alexander Scots' College, a massive mint, Queen's Hall, a museum, gardens, an observatory, three race courses and a cricket ground. It has an efficient tram service and the streets are well lighted and paved. The manufactures include machinery, earthenware, clothing and tobacco products. Perth was founded in 1829, was incorporated in 1856 and was created a city in 1880. Population in 1909, including the suburbs, estimated at 54,354.

Perth Am'boy, N. J., a city and port of entry of Middlesex Co., 21 m. s. of New York City and 15 m. s. of Newark, on Raritan Bay at the mouth of the Raritan River, at the south end of Staten Island Sound, opposite Tottenville, N. Y., and on the Pennsylvania, the Central of New Jersey, the Lehigh Valley, the Staten Island Rapid Transit and other railroads. A line of steamers connect Perth Amboy with New York and neighboring cities and towns. The city is also connected by bridges with South Amboy, on the south shore of the Raritan River. Perth Amboy has a fine harbor, shipyards and dry docks, and controls important shipping interests, especially in coal. Valuable deposits of fire clay and kaolin are found in the vicinity. Among the historic buildings are the Franklin Palace, erected in 1764-74, the home of William Franklin, the son of Benjamin Franklin, and the last British governor of New Jersey. The Parker Castle, a center of Loyalist influence during the Revolutionary War, is another noteworthy building. There is a fine city-hall park. The city has important manufacturing industries which are represent-

ed by iron foundries, steelworks, smelting and refining plants, shipbuilding yards, terra-cotta, brick and copper works, chemical works and railroad shops and yards. There are also manufactories of white ware, cork, emery, drain pipes and gasoline launches.

Perth Amboy was founded in 1683. It was first called Amboy after the original Indian name. In 1684 the settlers who were from Scotland named the place Perth, after James, Earl of Perth, but Amboy was soon added. Perth Amboy was incorporated as a city in 1718. Population in 1920, 41,707.

Peru, *Pe roo',* a republic of South America bordering on the Pacific Ocean. It is bounded on the n. by Ecuador, on the e. by Brazil and Bolivia, on the s. by Bolivia and Chile and on the w. by the Pacific Ocean. The coast line is about 1240 m. long and the width is from 300 to 400 m. The total area, exclusive of Tacna and Arica and other disputed territories, is about 480,000 sq. m.

Surface and Rivers. There are three distinct divisions of the surface of Peru. The coast desert, or dry zone, extends along the Pacific, and varies in width from 20 m. to 120 m. in the north. It is generally sandy, and as it rises from the ocean it meets the Andean foothills at a height of about 1000 ft. Where river valleys cross it, the destitute and barren surface is changed to one of perpetual vegetation. The second region, that of the Andes, is about 250 m. wide. The enormous chains of mountains contain three Cordilleras and the loftiest peaks rise to a height of 20,000 ft. The central of these three ranges forms the water parting between the Pacific and the Atlantic drainage systems. From these Cordilleras extends the plain of the Upper Amazon, known as the Montaña. It is 800 m. in length and is generally covered by a dense tropical vegetation.

The western part of the country contains only feeble streams, and of those which rise in the mountains only the Santa flows perennially to the ocean, the rest being lost in the parched sands of the desert. The short coast rivers are used for irrigation; among the most important are the Santa, Piura, Chira and the Rimac. On the eastern slope of Peru are numerous rivers, included in the Amazon basin, and these carry large volumes of water and have economic significance because of their use for navigation purposes. The important rivers are the Marañón, the Huallaga and the Ucayale, and the tributaries of the Madeira and Purus. Lake Titicaca, lying partly in Bolivia, is the only large lake.

Climate. Variations of climate are caused by the great differences of elevation and the influence of trade winds. These winds bring heavy precipitations upon the eastern mountains and give to the central part an adequate water supply. At intervals of seven or eight years a change comes over the desert, due to sufficient rainfall, and the parched surface is rapidly covered with luxuriant vegetation. This new pasturage, lasting only a few weeks, attracts huge herds of cattle and goats from the neighboring territory. January and February are the hottest months, but the dry heat is not oppressive, and a constant inrush of sea air refreshes vegetation, while at nightfall cool breezes come from the mountains.

Agriculture and Mining. Irrigation works have done much to improve the productivity of the soil. The staple crops are sugar, coffee and cotton, sugar being the great export crop. The sugar cane enjoys here an unusually healthy growth and occupies over 370,000 acres of irrigated land. Other crops are rice, tobacco, alfalfa, maize, vegetables and fruits of all kinds. The cocoa tree yields large returns for export purposes, and from the coca are derived large supplies of coca and cocaine. The annual shipment of rubber from the Montaña averages 1500 tons.

There is vast mineral wealth in Peru even now, though it has lost its former importance among the countries of South America. Silver and copper are found in abundance, and gold, antimony, lead, petroleum, salt, borax and anthracite and bituminous coal are also found. The

great center of the silver industry—the staple mineral product—is at Cerro de Pasco.

Manufactures, Commerce and Transportation. The manufactures are not highly developed. The principal products are cotton cloth, boots and shoes, furniture, watches, beer, saddlery, soap, lard and cottonseed-oil cake. The straw hats made by the Indians are improperly named Panama hats as they are placed upon the market, the name being rightly used of the product of the natives of Ecuador. The principal imports of Peru are cottons, woolens, furniture, small wares, provisions, wines and drugs; the exports, ores, sugar, cotton, wool, coffee, borax, rice, hides and cocaine. For the raw sugar, which is chiefly produced, Great Britain, the United States and Chile are the main markets. The port of Callao is the principal port of call for foreign vessels. The merchant marine is small. There are over 1000 m. of railroads, connecting the large inland towns with their seaports, but the railroad system is still in sections and there is great need for intervening branch lines. The roads and bridges are also deficient and inadequately serve their purpose. Much of the transportation is still on the backs of horses, mules and llamas.

Government. Peru is a centralized republic, its government being based on the constitution of 1860. Citizenship is granted to all the inhabitants who are over 21 years of age, and to all married men under that age. Right of suffrage is enjoyed by all who pay taxes, possess real estate or workshops and who can read or write. The president, who exercises legislative power, must be a native Peruvian, at least 35 years of age, and he is elected by direct vote for four years. Six ministers assist him and their signature validates his acts. A Senate, of 48 members, and a Chamber of Deputies, of 108 members, constitute the legislative branch of the government. Peru is divided politically into 17 departments and two provinces, each department being divided into 90 provinces, and the senators are elected by these departments, according to the number of provinces found in each one.

Inhabitants. The inhabitants of Peru are largely mixed, the dominant race being of Spanish origin, though largely mixed with Indian blood. The Indians represented are descendants from the tribes organized under the rule of the Incas at the time of the Spanish conquest. Aside from the mixed bloods, Spaniards and Indians, the chief representatives are negroes and Chinese, together with a few other Asiatic races.

Education and Religion. Free public schools are maintained and elementary education is compulsory. High schools are maintained by the government and some of them are under the direction of Europeans. The University of San Marcos is the principal educational institution; smaller universities are those of Cuzco, Trujillo and Arequipa. The State religion is the Roman Catholic, and public exercise of any other faith is prohibited by the constitution. Greater toleration, however, is practiced, and Protestant churches and missionary schools are maintained at Lima, Callao and Cuzco.

History. Ancient Peru was the center of the Inca Empire. In 1531 Pizarro and a small band of adventurers invaded the country, which, by about 1540, they had subdued. It was an easy conquest, for the Indians had long been disturbed by the quarrels of rival factions. The Spaniards at once enslaved the natives, whom they otherwise misused. Authorities at Madrid finally intervened, and the "New Laws for the Indies," 1542, virtually freed all those enslaved and assured them payment for their labor. The first 18 years of Spanish occupation of Peru were spent in fighting over spoils, and the next century and a half brought contending rulers and parties. In 1718 the Province of Quito was detached from Peru, which, previously, had been made one of the four South American viceroyalties. The Jesuits were expelled in 1767, and 13 years later the Indian rebellion under Tupac Amaru broke out. A large section of the southern Atlantic

region was added to Buenos Aires in 1788.

In 1816 Peru attempted to gain her independence, but the struggle did not end until 1826. The constitution still used was adopted in 1860. From 1879 to 1883 Peru was at war with Chile and Bolivia over a disputed nitrate claim. By the terms of peace, the provinces of Tacna and Arica were to be held by Chile for ten years, when a popular vote should decide which country should retain them. The time has been extended, and the territory has become practically Chilean. On Dec. 18, 1907, the first treaty of amity with Chile, since the war, was made. Boundary disputes with Bolivia had been going on for some time when, in September, 1909, Bolivia accepted the decision, unfavorable to itself, which the President of Argentina had made as arbitrator. Population, estimated at 4,700,000.

Peru, Ill., a city of La Salle Co., about 55 m. n.e. of Peoria and 100 m. s.w. of Chicago, at the head of navigation on the Illinois River; and on the Illinois and Michigan Canal, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and other railroads. In connection with the several industrial enterprises are operated foundries and machine shops, zinc works, manufactories of farming tools, breweries, a planing mill, a clock factory, zinc-rolling mills, grain elevators, a furniture factory, nickeloid works, scale, wheel, pump and boiler works and a fertilizer factory. Peru is the seat of St. Bede College (Roman Catholic), and among its other attractions are a Masonic Temple, Turner Hall, municipal buildings, a public library, a public square and parks and several bridges. First settled in 1827, Peru was laid out in 1834 and chartered in 1852. Population in 1920, U. S. Census, 8,869.

Peru, Ind., a city and county seat of Miami Co., 74 m. n. of Indianapolis and 16 m. e. of Logansport, on the north bank of the Wabash River and on the Lake Erie & Western, the Wabash, the Chicago, Cincinnati & Louisville and other railroads. It is situated in an agricultural region and derives considerable trade from the adjacent country. The chief manufacturing establishments include confectionery factories, carbon works, steel plants, bag and basket factories, plate-glass works, woolen mills, electric-appliance works and car-repair shops. Peru contains the Wabash Railroad Hospital and a sanatorium. There is a public library. It was incorporated in 1848 and received a city charter in 1852. Population in 1920, 12,110.

Perugino, *Pa" roo je' no,* **Pietro** (1446-1523), an Italian painter, one of the leading masters of the Umbrian School. He led a wandering life, working in Perugia, Bologna, Rome and Florence. Commissioned by the Pope, he executed a noteworthy series of frescoes for the Sistine Chapel, of which the *Delivery of the Keys to St. Peter* is the most important. His highest attainment is marked by the decorations of the Sala del Cambio, Perugia, with its allegorical and Scriptural subjects. Next to these frescoes, his greatest mural painting is the *Crucifixion* in the Santa Maria Maddalena, Florence. Perugino is chiefly remarkable for those qualities which are a fundamental part of the work of his great pupil, Raphael. These are accurate knowledge of perspective and a bold and broad treatment of space.

Peru'vian Bark. See QUININE, *Kwi" nine.*

Pes'simism (from Latin *pessimus*, worst), a term, opposed to optimism, used with various shades of meaning. In general, pessimism is a disposition to look on the dark side of things and to take a hopeless or unfavorable view of life. It is also used to denote the doctrine that pain and evil overbalance pleasure and good in life, and that life is therefore undesirable. It involves a feeling of human inability to work out the good in the face of the hostile forces of nature and of evil arrayed against man.

While pessimism is largely a matter of mental and ethical temperament rather than a philosophic doctrine, there is nev-

ertheless a metaphysical pessimism. This is in the main connected with materialistic philosophy, as optimism is connected with idealistic systems. It should be noted, however, that evolutionary theories have introduced into such materialistic philosophy as that of Herbert Spencer, an optimistic tone to the effect that the survival of the fittest will gradually produce a better world. Pessimism is characteristic of Oriental pantheism, and especially of Buddhism. It appeared in Greek philosophy, more particularly among the Epicureans; but the ancient Mediterranean peoples were too heartily in love with life for pessimism to gain much influence. Among the Teutonic peoples of the North it later found a more congenial home, because of the gloomy fatalism characteristic of their temper and traditions. In more recent times it has received systematic expression in the philosophy of Schopenhauer and of Von Hartmann. Christianity has proved the great foe of pessimism.

Pestalozzi, *Pes" ta lot' se,* **Johann Heinrich** (1746-1827), a Swiss educator and reformer, born at Zürich and educated at the university of that city. Turning aside from politics after the death of a friend, he devoted himself to education—as he had previously to schemes for bettering the conditions of the people. He married at the age of 23; and in 1775 he began receiving into his farm-home the children of paupers. Here he continued to maintain a sort of industrial home for them until 1780. Thus he acquired much of that intimate knowledge which his books reveal concerning the wretchedness of the poor.

During the French invasion of Switzerland in 1798, and until June, 1799, when military necessities compelled him to move, he cared with the utmost devotion for a number of children left on the shores of the Lake of Lucerne without parents, home, food or shelter. During the succeeding five years he conducted a school which he had established at Burgdorf.

After removing this school in 1805 to a castle granted by the government at Yverdun, he continued until nearly 80 years of age to work steadily for the uplift of his pupils and the development of his ideas concerning education. In this school there were enrolled pupils from the United States and almost every country of Europe; among them were Delbrück, Carl Ritter, Froebel and Zeller. The school was visited by many eminent people of the time.

Pestalozzi was one of the world's greatest educators. He believed that teachers should stimulate their pupils to exercise all their powers. He believed in education through observation; that children learn to do by doing and that the moral education should go hand in hand with industrial and intellectual training. His principles as set forth by Joseph Payne and quoted in Painter's *History of Education* are as follows:

1. The principles of education are to be sought in human nature.

2. This nature is organic, consisting of physical, intellectual and moral capabilities, ready and struggling to develop themselves.

3. The function of the educator is both negative and positive. He must remove impediments to the learner's development, and he must also stimulate the exercise of his powers.

4. Self-development begins with sensations received through the senses. These sensations lead to perceptions which, registered in the mind as conceptions or ideas, constitute the basis of knowledge.

5. "Spontaneity and self-activity are the necessary conditions under which the mind educates itself, and gains power and independence."

6. Practical aptness depends more on exercise than on knowledge. "Knowing and doing must, however, proceed together. The chief aim of education is the development of the learner's powers."

7. All education must be based on the learner's own observation—on his own personal experience. "This is the true basis of all knowledge. The opposite proceeding leads to empty, hollow, delusive word-knowledge. First the

reality, then the symbol; first the thing, then the word."

8. What the learner has gained by his own observation has become an actual possession which he can explain or describe in his own words. His ability to do this is the measure of the accuracy and extent of his knowledge.

9. The learner's growth necessitates advancement from the near and actual to the more remote; hence, from the concrete to the abstract, from particulars to generals, from the known to the unknown.

Pestalozzi's doctrine constituted the foundation of the new education, and he has exerted a greater influence than any other educator in molding the educational systems of Europe and America. His schools lacked organization, and his teaching was apparently without system. These defects were very evident in his school at Stanz, yet Roger de Guimps says of it: "It is out of the folly of Stanz that has come the primary school of the 19th century." The philosopher Fichte said of him: "It is of the institute of Pestalozzi that I expect to regenerate the German nation." His chief works are: *Leonard and Gertrude, How Gertrude Teaches her Children* and *The Book for Mothers.* Consult De Guimps, *Pestalozzi.*

Peter I (1846-), King of Servia. His grandfather, George Petrovitch, became Prince of Servia in 1812; his father, Alexander, became Prince of Servia in 1842, but was deposed in 1858. Peter attended a Hungarian school and the French military school of St. Cyr. As a French officer, he distinguished himself in the Franco-German War, and he encouraged the uprising in Herzegovina which resulted in Servia's independence. From 1890 to 1903 he lived in Switzerland, a recognized "pretender," and on the murder of Alexander of the Obrenovitch dynasty, was elected King of Servia in June, 1903. He was one of the leaders in the war against Turkey in 1912.

In history he will be remembered in connection with the World War. It was to his government that the ultimatum was dispatched by Austria that precipitated the war. He directed the short defensive campaign that defeated the Austrian advance in 1914. Subsequently, when Servia was ground under the heel of military conquest the government was removed to Greece. When the war ended Peter himself remained in retirement, feeling, at his age, unequal to the task of reconstruction awaiting the government knowing that his country was to be the leading province of the new nation—Jugo-Slavia—already organizing, of which the crown prince, Alexander, was crown regent.

Peterborough, *Pē' ter bur o,* a city of Canada in the Province of Ontario, on the Otonabee River and on the Canadian Pacific, Grand Trunk and branch line railways, 76 m. n.e. of Toronto. It is on the Trenton Waterway, which has at this point the largest hydraulic lift lock in the world. The city is the distributing point for a flourishing agricultural district. It is the seat of a Roman Catholic cathedral. The population in 1911 was about 18,360.

Peter, Epistles of. See PETER, SAINT.

Peter Lombard, or **Peter the Lombard** (about 1100 to 1160), Bishop of Paris, a noted Schoolman better known as "Master of the Sentences." Born at Novara, Italy, of obscure parents, about the beginning of the 12th century, he secured his education at Bologna, Rheims and finally, at Paris, where he was the pupil of Abelard. He soon distinguished himself here as a teacher of theology, and was made Bishop of Paris in 1159. His famous hand-book of theology, the *Sentences,* was compiled in four volumes from the Church Fathers, chiefly from his favorite Augustine. The work quickly attained immense popularity, became the textbook in nearly every theological school of Europe, and for 500 years was the basis of disputations, lectures and endless commentaries.

Peter, Saint, or **Simon Peter,** one of the Twelve Apostles. He was a native of Bethsaida and, in early manhood, a resident of Capernaum, where he en-

gaged in the occupation of fishing. After Jesus began his public ministry in Galilee, Peter, together with his brother Andrew, "forsook his nets" and became a permanent disciple of the Lord. Peter was one of the three apostles with whom Jesus was most intimate, being present at the Transfiguration and the scene of agony in Gethsemane. Eager and impulsive, he could be aggressively active when the soldiers came to arrest his Master, and yet be capable of denying him but a few hours later. After the experience of Pentecost and the interview in which Jesus made known to him his apostolic mission, Peter became a steadfast and prominent leader of the early Church. Roman Catholics consider him the first pope, and it is probable that he resided in Rome for a longer or a shorter period. Tradition ascribes to him a martyr's death on the cross.

The two *Epistles of Peter* are attributed to him. *First Peter* was probably written from Rome, A. D. 75-85. *Second Peter* is thought to have been written in A. D. 100-150, but some good authorities say as early as A. D. 65. The purpose of the first Epistle was to encourage the Christians of Asia Minor to live cheerfully and patiently, steadfast in hope, in the midst of persecution. The second Epistle is to an unnamed circle of Christians, who are exhorted to live the complete Christian life and to be on their guard against false teaching.

Pe'tersburg, Va., a city and port of entry, on the boundary line between Dinwiddie, Chesterfield and Prince George counties, on the Appomattox River, at the head of navigation. It is 22 m. from Richmond and is on the Seaboard Air Line, the Atlantic Coast Line, the Norfolk & Western and other railways. The river is here crossed by several steel bridges; and the harbor has been greatly improved by the Federal Government. Petersburg has numerous industrial activities, including manufacturing, which is facilitated by the excellent water power derived from the falls above the city. Chief among the factory products are trunks, dyes, bags, silk, knit goods, wearing apparel, brick, machinery and veneer. Foundries, lumber mills and wheel factories are operated. A large trade in cotton, trunks, tobacco, peanuts, fruits and vegetables is maintained.

Petersburg is the seat of the Virginia State Central Hospital, for the negro insane; the Southern Female College, a nonsectarian institution, opened in 1863; and the Virginia Normal Collegiate Institute, a coeducational institution of higher learning for negroes. There are also two orphanages, a home for the sick, the University School for boys, the Bishop Payne Divinity School (Protestant Episcopal), for negroes, a Y. M. C. A., a benevolent mechanics' association, some fine buildings, two public parks and three cemeteries — two National and one Confederate. Founded in 1733, Petersburg was incorporated in 1748 and was chartered as a city in 1850. The city and vicinity were the scene of much fighting during the Virginia campaign of 1864-65 (See CIVIL WAR IN AMERICA), which involved the operations of the opposing armies of Lee and Grant. Population in 1920, U. S. Census, 31,012.

Petersburg, Siege of, one of the most celebrated campaigns of the Civil War, waged about Petersburg and Richmond, Va., June, 1864, to April, 1865. Grant's army, 120,000 strong, had pushed Lee's 70,000 Confederates southward to Petersburg and Richmond, where by June 10 they were strongly posted. Hostilities opened that day when Butler attempted to destroy the Appomattox bridges and to take Petersburg. But this project failed, as did a similar one, four days later, under Smith, 9000 Union men being lost in these two expeditions. On July 30 was sprung the Petersburg Mine, charged with 8000 lb. of powder. General Rosecrans had run this for over a distance of 500 ft. below the Confederate lines about Petersburg, and he planned to rush into the breach caused by the explosion and capture Cemetery Hill, which overlooked the town. The attempt failed and the Federalists were trapped in a crater 200 ft. long and 60 ft. wide, where 4000 were killed. Sub-

sequent assaults upon the works all proved ineffective; but on Apr. 2, Grant ordered a general attack at Petersburg all along the line, and this, following an almost continuous bombardment of a week, caused Lee to evacuate Richmond and Petersburg simultaneously.

Pe'terson, William (1856-), an eminent scholar and educator, born in Edinburgh, Scotland, and educated at Göttingen, Edinburgh and Oxford universities, attaining to the highest honors in scholarship in these institutions. From 1879 to 1882 he was assistant professor of humanity in Edinburgh University and principal of Dundee University from 1882 to 1895. In the latter year he was chosen principal of McGill University, Montreal, where he has had a long and distinguished career. He is recognized as one of the great educators of America and has had honorary degrees conferred upon him by the leading universities of Europe and the United States. In 1905 he was appointed a trustee of the Carnegie fund for disabled professors, and in 1910 he was elected chairman of the Carnegie Foundation for the Advancement of Teaching. Besides his many contributions and periodicals, Dr. Peterson has edited and annotated *Quintilian's Institutes of Oratory, The Speech of Cicero for Cluentius, The Cluni Manuscripts of Cicero* and several other Latin works.

Peter the Great (1672-1725), Czar of Russia. He succeeded his half brother, Feodor, and when his half sister, Sophia, started an insurrection it resulted in the crowning of Peter and his weak-minded half brother, Ivan, in 1682, with Sophia as regent. In 1689 Sophia had to give up her rule and retire to a convent, and by Ivan's death in 1696 Peter became sole ruler. He immediately began the organization and development of an army and navy, and he seized Azov on the Black Sea from the Turks. He sent young Russian nobles to study abroad and invited skilled men of all trades to Russia. After suppressing a revolt in 1697, Peter traveled in Europe to gain first-hand knowledge of the civilization of other countries. He even worked as a ship carpenter at Amsterdam and Saardam. He was recalled from England to put down another revolt. He forced Western customs upon his people and reorganized the Church with the czar as its head.

Peter was at first defeated in a war with Sweden, but in 1709 he won a decisive victory at the Battle of Poltava. He was defeated in his contest with the Turks and compelled to give up Azov. When the wars with Sweden ended in 1721, Russia had gained the land and the islands along the coast of the Baltic Sea. In 1703 Peter founded St. Petersburg, which became his capital.

Peter completely changed the political history of his country. Before his time, Russia had belonged to the nonprogressive East, but by his political, social and industrial reforms he brought it into the family of European nations. Consult Schuyler's *Peter the Great;* Motley's *Peter the Great.*

Peter the Hermit, or **Peter of Amiens,** *A" myan'* (about 1050-1115), an ardent priest of Amiens whose exhortations helped to inspire the First Crusade. At the command of Pope Urban II, Peter told the French people of the indignities and wrongs he himself had witnessed to pilgrims in the Holy Land. Arousing the enthusiasm of the people, Peter passed into Germany and Italy. Numerous bands joined him and set out under his leadership for the East. Because of imprudent organizations and lack of discipline the expedition was a failure, most of the Crusaders perishing in Hungary and Bulgaria. Later Peter distinguished himself by great bravery at the storming of Jerusalem. At the end of the First Crusade he returned to France. See CRUSADES.

Petition, *Pe tish' un,* **of Right,** the statement drawn up by the House of Commons when Charles I assembled Parliament in 1628. It contained a detailed statement of the grievances which Parliament had against the King, and rehearsed the old laws which Charles had violated, then petitioned that the ancient

rights might be restored. It also contained the important provision that freemen should not be arrested without due process of law, and cited the statutes which forbade levying taxes or loans without consent of Parliament, the quartering of soldiers on private citizens and proclaiming martial law in time of peace. Much against his will, Charles was compelled to assent to the demands in the petition.

Petrarch, *Pe' trahrk,* **Francesco** (1304-1374), an Italian poet, born at Arezzo, Italy. His father, as a member of the party of the Bianchi, was forced to live in exile during the poet's childhood, and the family moved from place to place, settling at Piso and later at Avignon. The son was given an opportunity to study law at Montpellier and at Bologna, but in 1326 he became an ecclesiastic at Avignon, and in the midst of the fashionable life there, it is thought that he met the Laura (in 1327) who was to become the inspiration of numerous of his late songs. Whether or not this person is anything more than fictitious is uncertain. In 1333 Petrarch began to wander around, in obedience to his impulses, and after traveling in Germany and France, came to Rome in 1337.

In 1340, after having enjoyed the solitude of Vaucluse for a short time, he was invited by the universities of Paris and Rome to visit each place and be crowned poet laureate. The following year, on Easter Sunday, he received the laurel crown at Rome. After that he traveled extensively and mingled freely with Boccaccio and other literary men of distinction, and finally died at Padua in the quiet of a life devoted to scholarly pursuits. More of his works, and those which he valued the most highly, were written in Latin, rather than in Italian. To the Latin writings belong *Africa, Carmen Bucolicum* and his Letters. His Italian verses, the *Canzoniere,* however, are the work for which posterity now cherishes his name. There is some resemblance in his work to that of Dante, and his Laura, next to the Beatrice of Dante, ranks among the noble creations made memorable in song. He encouraged the study of the Latin language and literature, and as such became a prominent humanist of his age. Chaucer was greatly influenced by the Italian poet, and, somewhat later, Surrey and Wyatt, writing in imitation of Petrarch's love sonnets, introduced that form of the lyric into England.

Pet'rel, a group of sea birds belonging to the same family as the albatross. They are characterized by long, narrow wings, rather long, hooked bills, webbed feet and tubular nostrils. The plumage is of a sooty-black color, thick and oily, and emits a musty odor. The name, meaning Little Peter, is derived from the habit these birds have of flying close to the water and touching the crests of the waves with their feet, giving the appearance of walking on the water, as did the Apostle Peter (*Matt. xiv, 29*). Petrels live in many parts of the world but are found in largest numbers in the temperate regions and in smallest numbers in the tropics. Except when nesting they are always at sea, and feed at night. They nest in colonies and lay a single egg in a hollow in the rocky shore.

Fork-Tailed Petrel. This petrel is about the size of a robin and is bluish-gray with white throat, chin and under tail feathers. It is common along the Pacific coast of North America from Alaska to California.

Stormy Petrel, or Mother Carey's Chicken. This little bird, smaller than a robin, is common on the Atlantic, is seldom seen near shore and is the smallest of the web-footed birds. When on the wing it bears a close resemblance to the brown swallow.

Pe'trie, William Matthew Flinders (1853-), an English Egyptologist. He was privately educated, and studied British archæology from 1875 to 1880, publishing two books on the subject. In 1880 he went to Egypt, where, working under the auspices of the Egypt Exploration Fund Committee, he surveyed the Pyramids of Gizeh, excavated the site of Tanis and discovered and excavated Naukratis, Daphne and other ancient

Egyptian cities. In 1892 he was appointed professor of Egyptology in University College, London. Professor Petrie has written on his activities and on subjects dealing with ancient Egypt.

Pet"rifac'tion. See Fossils.

Pet'rified Forests, a name given to geographical areas containing extensive deposits of fossil trees. Such deposits occur in Wyoming, Utah, California, Arizona and New Mexico. Yellowstone Park also contains quantities of petrified wood. The petrified forest of Arizona, however, is the most remarkable formation of this kind in the world. Many of the petrifactions resemble agates and when polished are very beautiful. It is protected by the United States Government. Numerous theories attempt to explain the petrifaction of these forests. It is believed by some geologists that the trees have been exposed to some violent volcanic action and surrounded by eruptive material which has preserved their shape. As the vegetable tissue of the wood decayed and disappeared, mineral matter found its way into the mold. See Geology; Paleontology; Fossils.

Petrograd: See Saint Petersburg.

Petro'leum, a mineral oil belonging to the so-called Bitumen Family and made up of compounds of carbon and hydrogen, with varying proportions of oxygen and nitrogen. The color ranges from water-white to yellow, straw color, dark brown or black, the darker varieties being the more abundant. The odor is usually very offensive and penetrating. Petroleum is the most valuable of the liquid bitumens, as asphalt is the most important of the solid varieties.

Formation and Distribution. It is generally believed by geologists that petroleum has been formed by the slow decomposition of the remains of animals and plants which were buried with the rocks in or near which the oil is found, heat and pressure producing petroleum from these forms of life just as they produced coal from certain plants (See Coal). Petroleum is one of the most widely distributed of all mineral fuels and it occurs in the rock formations of almost every geological age. Petroleum is usually found in sandstone or limestone, but it sometimes occurs in conglomerate, or "pudding stone." It occurs in the multitude of tiny pores in the rock, not, as was formerly supposed, in subterranean lakes, pools or streams of oil. All rocks containing oil are bent into arch-shaped folds, the gas with which the oil is invariably associated having a tendency to move into the arch, while the oil collects in the flanks of the fold. The oil rock is always found to be covered with a fine-grained, nonporous rock layer, without fracture, which keeps the oil from escaping.

While petroleum has been found in many regions, those especially noted for its production are the United States and Province of Baku in Russia, bordering on the Caspian Sea. The Dutch East Indies, Mexico, Peru, Austria-Hungary and Canada also produce considerable quantities. The five leading fields in the United States in the order of their production in 1911 were California, Oklahoma-Kansas, Illinois, West Virginia and Ohio. The production constantly varies so that the rank of the fields frequently changes. Petroleum has been found in nearly every state in the Union and in Alaska, and Pennsylvania, Texas, Louisiana, Indiana and New York are important petroleum-producing states.

The Canadian field is in the western part of Ontario between lakes Erie and Ontario. Its annual yield is about 316,000 barrels a year.

Crude Petroleum. Crude petroleum is obtained by boring wells to the layer of rock in which it is stored, and every oil field contains as many derricks as it has wells (See Well Boring). To start a flow of oil it is frequently necessary to discharge explosives at the bottom of the well. This operation, known as "shooting," results in a temporary rush of oil to the surface. Sometimes the store of oil and the pressure of its accompanying gases are so great as to produce what is known as a "gusher." A stream of oil rising high above the surface will discharge at the rate of several

hundred barrels a day, often for several days.

After the drilling has been accomplished, the oil is pumped through small surface pipes to local storage tanks. From these tanks it is pumped through large, underground pipes, to the great refining centers.

Refining. When properly treated, crude petroleum yields a large number of useful products. Refining consists in separating these products from the crude oil and preparing them for use. The first step in the process is distilling the crude oil. The stills consist of tanks made of boiler iron. The largest are 30 ft. long and 12½ ft. in diameter and hold 600 barrels. Some are placed horizontally and some vertically. Above the tank is a vapor chest, from which a number of pipes lead to separate condensers (See Distillation). The most volatile oils, such as naphtha, gasoline and benzine, are changed to vapor at low temperatures. As the vapor passes through the condenser, it is changed to liquid. The workmen know at what temperature each of these oils is vaporized, and when one has been separated, the temperature is raised to the degree necessary to separate the next. Thus naphtha, gasoline, benzine and kerosene are separated in the order given. Following kerosene are heavier illuminating oils, lubricating oils and paraffin, if the petroleum contains it. There is a residue, which, if heated to the necessary temperature, forms coke, but the process is usually stopped short of this. By what is known as the "cracking" process, which consists in distilling the product remaining in the tank after the kerosene is expelled, at a temperature considerably above the boiling point, grades of oil between kerosene and lubricating oil are obtained.

The light oils are purified by treating them with sulphuric acid and a solution of caustic soda and by washing. Each grade of oil must withstand the required tests before it can be legally placed upon the market.

Transportation. Petroleum oils are transported by rail in tank cars, constructed especially for the purpose; in barrels and in limited quantities in the cans. For ocean transportation tank ships are constructed. For local use the oils are usually stored in tanks made of boiler iron and so located that they are free from danger by fire, and so that the town is likewise free from any danger that might arise from their explosion. There are usually several tanks in a group, each for a different kind of oil. Kerosene and gasoline are often peddled in tank wagons and cans. After distillation each product must be submitted to its own series of tests before it is ready for the consumer.

Products and Uses. Nearly 200 products have been obtained from petroleum, and the uses to which they can be put are almost limitless. The illuminating oils are the most important, and chief among these is kerosene. Next in importance are the oils used for fuel, the most valuable of these being gasoline and naphtha. Lubricating oils made from petroleum and which are marketed under various trade names furnish nine-tenths of the world's supply. Paraffin and vaseline also hold an important place on the list; and the crude oils are used extensively in metallurgical processes, such as smelting and refining, in glass manufacture, as a solvent of caoutchouc and in many other ways. Crude petroleum is extensively used for fuel in locomotives, on steamships and to some extent with stationary engines.

History. Petroleum has been known and used for various purposes from the earliest times. It was first discovered as a scum on the surface of water, and in some instances it flowed from springs. It was employed by the Assyrians as a constituent of mortar and is said to have been used for lighting purposes by the Chinese more than 5000 years ago. It was used by the Egyptians for embalming and preserving papyrus. It was also used for various purposes by the Greeks and Romans. The oil traffic of Baku is of great antiquity and the use of natural gas for feeding fires in that region was a never-ending source of wonder to the

primitive people. Petroleum was known to the American Indians long before it was discovered by white men in this country. The Indians used the oil for medicine, taking it from the surface of creeks by spreading blankets on the surface of the water and then wringing the oil from them. The Seneca Indians introduced it to the whites as a cure for rheumatism, and before its discovery in large quantities it was sold by druggists as Seneca oil. The first well for oil was sunk by Mr. E. L. Drake at Titusville, Pa., in 1859. This well produced 2000 barrels the first year. From this small beginning the oil industry in the United States has developed to its present proportions. The total yearly output of all the oil wells of the country amounts to about 376,000,000 barrels of 42 gallons each, valued at approximately $623,000,000. See GASOLINE; KEROSENE; PARAFFIN; VASELINE.

Petu'nia, a low flower-garden herb of the Nightshade Family originally brought from South America. The leaves are rough and pointed and grow thickly on the flower stem. The flowers are trumpet-shaped with a spreading brim, and have a delicate fragrance. They vary in color, being blue, purple, red or white.

Pe'wee, a bird of the Flycatcher Family. This little flycatcher is a trifle larger than the English sparrow. It is brownish-gray above and whitish beneath, and the wings have two white bars across them. The little wood pewee may usually be seen perched on a limb, from which it will dart out suddenly and catch an insect on the wing, returning immediately to the same limb. It usually lives in the woods, though at times it will build its nest near human habitations. The lichen-covered nest is skillfully hidden and is saddled on a limb, usually high up in a large tree. From two to four white eggs are laid, the larger end being irregularly marked with brown or purple. The song is a mournful "pe-a-wee, pe-a-wee, pee-a." From this song the bird is named.

Pe'wit. See LAPWING.

Pew'ter, an alloy of tin and lead in proportion of four parts tin and one part lead. This alloy is known as common pewter. In appearance it is somewhat duller than tin. It is softer and more easily melted. Formerly pewter was extensively used in making plates, teapots and other household utensils, but it has been replaced by other alloys. Plate pewter consists of 90 parts tin, 7 parts bismuth, 2 parts antimony and 1 part copper. This is a harder and somewhat more brilliant alloy.

WOOD PEWEE

Phaëthon, *Fa' e thon,* in classic mythology, son of Apollo by the ocean nymph Clymene. Being ridiculed for claiming divine origin, Phaëthon, at the suggestion of his mother, traveled to the palace of the sun god, from whom he asked proof of his parentage. Embracing his son, whom he gladly acknowledged, Apollo promised, on oath, to grant him whatever he might ask. The rash youth chose to drive, for one day, the flaming car of the sun, nor would he be dissuaded. Terrified for the safety of his boy, with the greatest reluctance and

many parting injunctions, Apollo at length placed in his hands the reins of his fiery steeds. Instantly perceiving that their master was not in control, the horses dashed so madly about, that the earth was soon on fire. The poles of heaven were smoking. The Africans turned black from heat. The Nile hid her head in the desert. The dried ground cracked open, letting light stream into Tartarus. Fearing that the entire world would be destroyed, Jupiter launched a thunderbolt at hapless Phaëthon, who was hurled, flaming like a shooting star, into the River Po. The Heliades, from lamenting their brother's death, turned into poplar trees.

Phalanx, *Fa' lanks,* the name given by the Greeks to heavy-armed infantry in line of battle, but more specifically applied to small divisions of infantry. The purpose of the phalanx was to present a solid front to the enemy. The men were generally placed so close together that their shields touched. The Spartan phalanx was eight ranks deep, but the Theban phalanx was deeper.

Phalarope, *Fal' a rope,* **Family,** shore birds related to the snipe and plover, having a long, narrow, sharp bill, long wings, and partly webbed or lobed feet. Three species occur in North America, of which the Wilson phalarope is best known. It ranges from Saskatchewan to Patagonia. It is about the size of the robin; the upper parts are brownish or dusky; the under parts are white; the chest and throat are buff; and the sides of the neck have a chestnut stripe. The female presents an unusual feature in bird plumage, being much brighter than the male, with back bluish-gray, chest and lower part of throat cinnamon, and under parts white, with a strong, black stripe along the sides, shading into chestnut on the neck and shoulders. The nest is placed in a slight excavation on the ground and lined with grass. It contains three or four brown-spotted eggs. The Wilson phalarope is usually found about marshy ponds. The male attends to the incubation of the eggs and the care of the young.

Phanerogam, *Fan' er o gam",* the name applied to the higher of the two great divisions of plant life. The group includes those plants that reproduce by seeds rather than by spores. Seeds are many-celled bodies containing the germ of the new plant, and differ from spores mainly in the fact that they must germinate before the new individual is produced. The classification of plants into phanerogams and cryptogams was made by Linnæus in 1735 before the close connection between the two divisions was known; hence differing names have been applied to organs that have the same function in both classes. The higher cryptogams, or spore-bearing plants, are now known to be so closely allied to the lower forms of phanerogams that the line of distinction between the two is not so definitely marked as was formerly supposed. See SEED; SPORE; CRYPTOGAM.

Pharaoh, *Fa' ro,* a Hebrew term used in the Bible to designate the kings of Egypt, corresponding to the P-Ra or PH-RA of the Egyptian hieroglyphics, signifying the sun. It is probable that the Pharaoh of the time of Moses was Rameses II, the Sesostris of the Greeks. The identification of Pharaohs mentioned in the Old Testament, with Egyptian kings, is attended with difficulty.

Pharisees, *Fair' i sees,* a religious sect of the Jews, probably originating at the time of the attempt of Antiochus Epiphanes to break down the distinctions between his Jewish and Greek subjects. They had become very influential at the time of Christ, when they stood as the national party in politics and religion. Their opponents were the Sadducees (See SADDUCEES). They affected great sanctity, were strict observers of external forms and ceremonies, and many of them were exclusive, self-righteous and proud. They held that the traditions of the elders had equal value with the written oracles, and that the oral law taught the continuance of life after bodily death, and the resurrection of the dead. Because of the attitude of the Pharisees toward the teachings of Christ, the term

Phariseé has become a symbol of self-righteousness and hypocrisy, but among the sect were sincere and pious men.

Pharmacist, *Far' ma sist.* See DRUGGIST.

Pharmacopœia, *Fahr" ma ko pe' ya,* a work containing lists of drugs used in medicine, together with recipes and prescriptions in general use by physicians. The pharmacopœia contains directions for ascertaining the purity of the drug mentioned; also directions for compounding prescriptions. Pharmacopœias are published by the government or by an organization which has government sanction. The British Pharmacopœia is published by the government. That in use in the United States is published by a convention composed of delegates from the medical colleges and societies. These delegates meet in a national convention in Washington every ten years and at each convention a revision of the pharmacopœia is provided for. The authority of this book is enforced by national and state laws, and all pharmacists are obliged to conform to the formulas it gives.

Pharmacy, *Far' ma sy,* or **Pharmaceutics,** *Far" ma su' tiks,* the practice of compounding and selling drugs under doctors' prescriptions. The growth of such a profession has been so gradual that no definite beginning can be pointed out, but it is probable that physicians and druggists were originally chemists or alchemists and no distinction was made between the two professions. Each doctor compounded his own remedies and applied them; his laboratory sufficed as a storage for his chemicals. Later, as the practice of medicine came to be recognized less as an exercise of witchcraft and more as a practical profession, the compounding of drugs was left to assistants who later became known as pharmacists, and their art as pharmacy or pharmaceutics. Now the title refers as well to the shop, which is called interchangeably, drug store or pharmacy.

Pharos, *Fa' ros,* a peninsula, formerly an island, of northern Egypt, partly occupied by the present city of Alexandria. It was upon this point that the Ptolemies erected a great lighthouse which was one of the Seven Wonders of the ancient world.

Pharynx, *Far' inx,* the cavity at the back of the mouth commonly called the throat. It is about four and one-half inches long and composed of muscle and membrane; and it may be described as a conical sac with its broad end turned upward toward the base of the skull and its narrow end extending downward and connecting with the gullet. It lies at the back of and below the mouth and nose and above the larynx and gullet. Seven openings communicate with it: the mouth, larynx, gullet, the two Eustachian tubes of the ears and the two nostrils. Its function is concerned with both the breathing and swallowing processes. When the food is thrown, by action of the tongue, into the pharynx, the muscles of the latter enlarge the opening to receive the food by drawing the sides upward and outward. The constrictor muscles of the pharynx contract upon the food, forcing it downward into the gullet. The pharynx also aids in the production of voice modulations. See LARYNX; MOUTH; PALATE; TONGUE.

Pheasant, *Fez' ant,* a genus of birds of which the common fowl, the cock and hen are the best-known representatives. The grouse and partridge belong to the same order. Pheasants were originally confined to Asia and take their name from the River Phasis, near which they were found in large numbers. True pheasants are beautiful birds. The male, brilliantly colored, is usually about 36 inches long, fully one-half the length being included in the tail. There are many species, but the Mongolian pheasant, golden pheasant and English pheasant are the best known.

In the English pheasant the head and neck are glossy green; the under parts are reddish ranging to purple; the rump is copper-colored; the wings are striped red and brown; and the tail is gray with black bands. The female is smaller than the male and of a brownish color, and lacks the long tail. Pheasants feed upon

insects, grain and seeds and take the food on the ground. There are usually several females and one male. The nest is rudely formed; the eggs are numerous but vary in number.

The Mongolian pheasant, golden pheasant and silver peasant have been introduced into Europe and the United States, where the English pheasant is also found. In England pheasants are raised for the stocking of game preserves, and in Oregon pheasant farms have been established to supply zoological gardens and private estates. See RUFFED GROUSE.

Phelps, *Felps,* **Elizabeth Stuart.** See WARD, ELIZABETH STUART PHELPS.

Phi Beta Kappa, *Fi Be' ta Kap' a,* a Greek letter society, founded at William and Mary College in Williamsburg, Va., in 1776. The initial letters of the Greek motto, *Philosophia Biou Kubernetes* (Philosophy is the guide of life), give rise to the name. It has chapters in the leading colleges and universities, and general meetings are held triennially. The membership is about 18,500. The badge is a gold watch key. Members are elected for distinction in scholarship.

Phidias, *Fid' i as,* or **Pheidias,** the greatest sculptor of ancient Greece, born at Attica about 500 B. C., the son of Charmides. The records of his life are scanty and contradictory; his works have perished and only copies of them and the testimony of contemporaries convey any idea of his genius. In this particular art form he achieved a perfect expression of the spirit of Greece in her day of glory. His works were the embodiment of ideal beauty. His statues were seldom executed in marble, but in bronze, gold and ivory. The Parthenon is generally supposed to have been designed by him and erected by two pupils after his death. Among his great works were a noble colossal statue, *Zeus at Olympia,* and the *Athena Parthenos* at Athens.

Philadelphia, *Fil" a del' fi a,* **Pa.,** a city, port of entry, chief city of the state, coextensive with Philadelphia Co., at the confluence of the Delaware and Schuylkill rivers, 90 m. s.w. of New York and 135 m. n.e. of Washington, on the Pennsylvania, the Baltimore & Ohio and the Philadelphia & Reading railroad systems. The city has 30 m. of water front lying between the two great rivers, with a 30-foot channel to the sea. The Schuylkill River is navigable for small vessels for about 8 m. above its mouth. The Delaware River is navigable to Trenton (N. J.), 30 m. above the upper part of the port of Philadelphia. The city is 102 m. from the Atlantic Ocean and has extensive coastal and trans-Atlantic steamship lines connecting with various European, West Indian and United States ports. In 1905, $750,000 was appropriated by the city and the state for the improvement of the Delaware River between Philadelphia and the southern boundary of the state, although the state had previously expended over $1,500,000 on the improvement of the Delaware and Schuylkill rivers. Philadelphia contains about 700 m. of street railway, including elevated, surface and subway lines. Several interurban lines also render excellent service to the many neighboring towns and cities. Philadelphia has well maintained its prestige as one of the great manufacturing centers of the country, and is situated within a comparatively short distance of the greatest coal fields in the world. In textiles, Philadelphia ranks high, both in the quantity and value of its output, and the iron and steel industry ranks next to that of textiles in value.

STREETS, PARKS AND BOULEVARDS. Philadelphia is laid out in rectangular squares, nearly all the streets intersecting at right angles. The north and south streets are numbered, and the streets running east and west are named. Market Street is the principal thoroughfare east and west, and Broad Street, north and south, these streets intersecting at City Hall Square. The wholesale district lies at the east end of Market Street near the Delaware River. The shopping center lies on the south side of Chestnut Street and on Arch and Market Streets. The larger office build-

ings and the Pennsylvania and Philadelphia & Reading railroad stations are near the city hall. Rittenhouse Square is the old aristocratic residential district, and many beautiful residences are on North Broad Street and the streets crossing it. Germantown and West Philadelphia are popular residence places. In fact, few cities in the country can vie with Philadelphia in the number and attractiveness of its residential suburbs. The most congested districts are along the narrow streets between the rivers. The improved streets total about 1800 m. Philadelphia contains 57 parks and squares. Fairmount Park is the largest public park in the world. It embraces within its domains 3341 acres. At the Green Street entrance is the bronze equestrian statue of George Washington, designed by Rudolph Siemering and presented by the State Society of the Cincinnati to the city at a cost of over $250,000. The park also contains a monument to Lincoln by Randolph Rogers; and an equestrian statue of Grant by Daniel Chester French and Edward C. Potter. The Smith Memorial entrance built of white granite, with bronze statues, was donated by Richard Smith and erected in memory of the officers of the Civil War. Fairmount Park also contains a large number of other fine statues, several artistic fountains and a Japanese temple gate. Franklin, Rittenhouse, Logan and Washington squares have been reserved for small public parks since the founding of the city. Penn Treaty Park contains a monument to mark the site of the elm tree where Penn is said to have negotiated his treaty with the Indians. West Park, which practically is a part of Fairmount Park, separated by the Schuylkill River, contains the Zoological Garden, the largest in the country. Memorial Hall, on the Lansdowne Drive, in West Park, was left standing as an art museum and memorial of the Centennial Exposition in 1876. There are also a large number of outlying parks and parkways, which include League Island, Penny Pack, Cobbs Creek, Torresdale and Hunting parks. Laurel Hill cemetery lies on a high bank of the Schuylkill River adjacent to Fairmount Park.

Public Buildings. The principal structure is the city hall, the largest building in the world devoted exclusively to municipal purposes. This building is 547 ft. high and is surmounted by a colossal bronze statue of William Penn by Alexander Calder. Other prominent buildings include the Bourse, in which will be found the commercial and maritime exchanges, the Masonic Temple, the Betz, Land Title, North American and Real Estate Trust buildings, Academy of Fine Arts, Academy of Music, the United States Mint, Broad Street Station, the custom-house, the Stock Exchange and Carpenter's Hall, in which building the First Continental Congress was convened.

The most famous historical building in the United States is Independence Hall, on Chestnut Street between Fifth and Sixth streets. There the Liberty Bell is enthroned in a space adjoining the room where the Declaration of Independence was signed. This famous bell bears the inscription: "Proclaim liberty through all the land unto all the inhabitants thereof." Independence Hall was purchased by the city from the state in 1816 and set apart as a museum of historical relics. The quaint Betsy Ross house, on Arch Street, is also preserved as a national monument, in which was made in 1777 the first United States flag.

Churches and Libraries. Philadelphia contains about 850 churches, the most noted of which is Old Christ Church (Episcopal), in which the pews of Washington and Franklin are preserved. The handsome Cathedral of St. Peter and St. Paul (Catholic) was 18 years in building; the South Memorial Church of the Advocate is a replica on a smaller scale of the Amiens Cathedral. The ivy-clad Old Swedes', St. Stephen's, St. Peter's and the Grace Baptist Temple are also noted churches. The important libraries include the University of Pennsylvania, the Franklin Institute, the Athenæum and Apprentices'. The Library Company, founded by Benjamin

Franklin in 1727 under the name of the Junto Club and renamed the Library Club in 1731, was, in 1869, made the beneficiary under the will of Dr. James Rush of an estate valued at $1,000,000. The building was enlarged in 1889. The Pennsylvania Historical, the Numismatic and the American Philosophical are old and famous societies.

Hotels and Theaters. Among the prominent hotels of the city are the Bellevue-Stratford, the Ritz-Carlton, the Walton, the Hanover, the Rittenhouse, the Colonnade, the St. James, the Windsor, the Stenton, the Continental, the Keystone, the Hamilton Court and the Majestic. The Walnut Street Theater, built in 1808, is claimed to be the oldest theater in the United States. Other theaters include the Lyric, the Adelphi, the Garrick, the South Broad, the Chestnut Street Opera House and the Little Theater.

Schools and Colleges. Philadelphia is one of the greatest medical educational centers in the United States, and the medical colleges include the department of medicine of the University of Pennsylvania, the Woman's Medical College (the first chartered school of medicine for women to confer the degree of M. D.), the Jefferson, the Medico-Chirurgical, the Hahnemann and the medical department of Temple University. The Philadelphia Dental College joined Temple University in 1907. Girard College is the most heavily endowed institution in the world for the care of orphan boys (See Girard College). The University of Pennsylvania is located at 34th and Spruce streets and is one of the most important educational institutions in America (See Pennsylvania, University of). Other institutions of learning include La Salle College (Catholic); Gratz College for the study of Hebrew and Jewish history; Lutheran Theological Seminary; St. Vincent's Academy; the Drexel Institute of Arts and Sciences, bestowing free scholarships; School of Industrial Art; William Penn Charter School; Franklin Institute; School of Design; and the Williamson Free School of Mechanical Trades. The public schools number about 328 and include the Central High School, William Penn High School for Girls, North East and Southern Manual Training schools and a normal school for girls. Bryn Mawr College is located near the limits of the city.

Hospitals and Charities. Philadelphia contains about 334 hospitals and asylums. The founding of the Pennsylvania Hospital, the first hospital in the United States, was largely due to Franklin. The municipal hospitals for contagious diseases and the indigent are maintained by the city, but nearly all the other institutions are supported by medical schools and the various religious denominations. Philadelphia is also the seat of the state penitentiary for the eastern district.

Home Interests. Philadelphia, known as the "Quaker City," or the "City of Brotherly Love," is essentially a city of homes and contains over 275,000 dwellings, with more home owners than almost any other city in the country. The city installed a new filtration waterworks plant and accessories in 1901-08 at a cost of $25,000,000, taking water mainly from the Delaware River.

Commerce and Industry. Shipbuilding has been an important industry of the city for over a century at League Island navy yard. Large sugar refineries and petroleum works are among the important industrial interests. The principal exports are iron and steel, flour, wheat and meat products. Among the manufactured products are locomotives, carpets and rugs, hosiery and knit goods, worsted and cotton goods, confectionery, chemicals, furniture, leather goods, felt hats, saws, oilcloth, druggists' preparations, cordage, fertilizers, millinery and lace goods, paint and varnish, paper goods, silk goods, tobacco and electrical machinery and supplies.

History. The site of Philadelphia was originally occupied by the Delaware Indians, although during the 17th century settlements were made by Swedes and Dutch near the mouth of the Delaware River. The patent granted to Wil-

liam Penn for the territory embraced within the commonwealth of Pennsylvania was signed on March 4, 1681, by Charles II. A year later Penn visited the place and laid out the city. On March 10, 1683, Penn presided at a meeting of the provincial council and from that time Philadelphia was the capital of the state until 1799, when the seat of government was removed to Lancaster. The town grew rapidly and was the most important city in the colonies, Quaker influence remaining especially strong. The convention which framed the Constitution of the United States sat in Philadelphia in 1787, and here the first mint for the coinage of United States money was established in 1792. In 1854 various adjacent districts and boroughs were annexed to the city by state legislative act. In October, 1908, Philadelphia celebrated the 225th anniversary of its founding. Population, 1920, U. S. Census, 1,823,779.

Consult F. M. Etting, *An Historical Account of the Old State House;* Agnes Repplier, *Philadelphia, the Place and People;* and J. T. Scharf and T. Westcott, *History of Philadelphia.*

Philæ, *Fi' lee,* an island of the Upper Nile, 6 m. s.w. of Assuan and recently partly submerged through the effect of the great dam built at the latter place. The island is famous for its historic buildings, memorials and other ancient structures. It was once supposed to be the favorite haunt of Isis, and many temples and shrines were there erected in her honor. Hadrian's Gateway is also a widely-known structure.

Philemon, *Fi le' mon,* **Epistle to.** See Pauline Epistles.

Philip, *Fil' ip,* **II** (1527-1598), King of Spain, only son of Charles V and Isabella of Portugal. He was an accomplished linguist and mathematician and a connoisseur in fine arts and architecture; but he was slow of speech and manner, distrustful and haughty. While very young he was intrusted, under a council, with the government of Spain, and in 1543 he was married to Mary of Portugal. Three years afterwards she died, and in 1554 he married Mary Tudor of England. In 1555 his father's abdication gave him the sovereignty of Netherlands, and on shortly receiving the throne of Spain, with its possessions in Asia, Africa and America, he became the most powerful potentate of Europe. Meanwhile, France, with the Pope and Sultan, had united to deprive him of his Italian dominions; but he speedily conquered the papal claims and forced France to agree to the Treaty of Cateau-Cambrésis, of April, 1559. His wife was now dead. Following his futile attempts to marry Queen Elizabeth, he espoused the daughter of Henry II of France. In 1566 the revolt of Netherlands began, resulting in the formation of the Dutch Republic by the seven united provinces of the northern portion.

In 1580 the direct male line of Portugal had become extinct, and Philip claimed the throne. After Alva had subdued the kingdom with Spanish troops, the Spanish monarch's title was recognized by Portugal and all its dependencies. Philip's hatred of England, due to the anti-Spanish policy of Elizabeth, caused him to undertake the conquest of that country. This bold attempt failed, however, with the destruction of the Armada in 1588, which date also marks Spain's fall from the rank of a first-class European power. During the rest of his reign Philip was concerned in waging war and intrigues against France; but he was glad to conclude the Treaty of Vervins in May, 1598. He died four months later.

Philip II (382-336 B. C.), King of Macedonia and father of Alexander the Great. He was born at Pella, the son of Amyntas II and Eurydice. During his youth he spent several years at Thebes, where he was held as a hostage. About 360 B. C. he succeeded his elder brother Perdiccas as king. When he assumed control of Macedonia, she was torn by internal dissensions and harassed by wars with foreign tribes. Philip at once exhibited rare ability both as a diplomat and as a military commander. Within two years he quelled all internal disturbances and defeated the tribes warring

against him. He then reorganized the Macedonian army and began the conquest of adjacent territory. He first conquered the Greek towns on the coast of Macedonia, then secured the gold mines of Thrace. Demosthenes in his orations, known as Philippics, tried to unite the Greeks against him as their common enemy, but failed. By 346 he was master of the Phocian cities and the pass at Thermopylæ. He became a member of the Amphictyonic Council and gradually extended his power, until at the Battle of Chæronea, 338 B. C., he completed the conquest of the Grecian states. He was made commander-in-chief of the Greek forces and began preparations of an expedition against Persia, but was assassinated before they were completed.

Philip Augustus, or **Philip II** (1165-1223), a King of France and son of Louis VII. He was crowned in 1179 and assumed control of the State the next year. He is considered one of the greatest kings of the Capetian dynasty. He made war on Flanders and thereby gained considerable territory. He then drove the Jews out of France and confiscated all their wealth. In 1190 he joined Richard of England in the Third Crusade, but quarreled with him on the way and returned to France. He then consorted with Richard's brother John for the partition of Richard's territories in France. Richard's return, however, prevented the consummation of the plot. A war followed, in which Philip was obliged to defend his dominions against the allied forces of England, Germany and Flanders, but he gained a brilliant victory at Bouvines in 1214. During the last years of his reign Philip consolidated his possessions, established numerous public institutions, encouraged commerce and improved Paris. He brought France to a commanding position among the nations of Europe.

Philip, King, or **Metacomet,** an Indian chief, the son of Massasoit. He became chief of the Wampanoag Indians on the death of his older brother. In 1675 he began his massacres of the colonists after repeated attempts of the whites to control Indian affairs. What is known as King Philip's War followed. Many of the neighboring tribes rose to his support, and both the colonists and the Indians suffered heavy losses. Many New England towns were destroyed. The Indian power weakened as their numbers grew constantly fewer, and in 1676 King Philip, his wife and son were captured, and Philip was put to death.

Philippe, *Fe" leep',* **Louis.** See Louis Philippe.

Philippians, *Fi lip' i ans,* **Epistle to the.** See Pauline Epistles.

Philippic, *Fil lip' ik.* See Demosthenes.

Philippine, *Fil' i pin,* **Islands,** a large group of islands lying east of the Malay Peninsula and constituting the principal insular possessions of the United States. They form a broad chain stretching from Formosa to Borneo, and they have the Pacific on the north and east, the Sulu Sea on the south and the East China Sea on the west. The entire group contains nearly 3141 islands, but only about 200 of these are named. The total area, including the Sulu Islands, is 127,853 sq. m., about the same as that of New Mexico. The principal islands are Luzon (40,969 sq. m.), Mindanao (36,292 sq. m.), Samar, (5031 sq. m.), Negros (4854 sq. m.), Panay (4611 sq. m.), Palawan, or Paragua (4027 sq. m.), and Leyte (3087 sq. m.). Manila is the capital of the islands and has been constituted a province (See Manila).

Physical Characteristics. The islands are chiefly of volcanic formation and have isolated peaks or irregular mountain ranges; the chief range is that of Luzon and is known as the Caraballos Mountains, some of whose peaks rise to an elevation of over 8000 ft. East of the mountains upon this island is a great valley, 150 m. long, crossed by the Rio Grande de la Pampanga and, at its southern extremity, indented by Manila Bay. The Island of Mindanao has loftier peaks, and Apo, a volcano upon this island, is the highest peak of the group. The rivers upon all of the large islands

of the group are plentiful, and many of them are useful for navigation. The principal lakes are Laguna de Bay, Taal and Cagayan in Luzon; Lanao and Maguindanao, in Mindanao; and Naujáan in Mindoro. The coasts are indented by numerous bays, many of which form excellent harbors.

CLIMATE. The Philippines lie in tropical regions, and the climate is, in general, warm and moist, with abundant rainfall. The temperature ranges continually between 100° and 60°. Lying in the path of the monsoons the islands are subject to severe hurricanes.

PRODUCTIONS AND INDUSTRIES. There are large natural forests of cabinet wood, dyewood and gum, all under the supervision of the United States Forestry Bureau. The forests are divided into 14 districts, each having stations of Forest Service in charge of foresters and rangers. The most important productions are hemp, sugar, coffee, rice, copra, tobacco, and indigo, but until recently methods of producing these crops have been primitive. The United States Department of Agriculture has established experimental farms in the effort to improve conditions. Under their direction destructive insects are being exterminated, better grades of tobacco, rice and hemp are being produced and only improved varieties of stock are introduced.

Of the mineral deposits lignite seems to be the most plentiful. Iron, gold, silver, lead, platinum, magnesium, sulphur, petroleum, rock salt, kaolin and gypsum are all mined, but under native methods they had not been especially abundant. Now the mines are being equipped with modern machinery, and the yield is increasing rapidly. The average value of the mineral output is more than $2,300,000 annually. The most valuable exports are hemp, copra, sugar, tobacco and cigars. Manufactured cotton goods, meat and dairy products, iron and steel products, flour and oil are imported, chiefly from the United States. Aside from agriculture and mining, the manufacture of liquors, shipbuilding, lumbering, printing and publishing and the making of straw goods are important industries. The women are generally adepts at weaving, producing excellent mats, rugs and blankets.

TRANSPORTATION AND COMMERCE. Traffic is carried on between the islands by means of native boats of varying character. Steamers and telegraph lines connect the islands with all parts of the world. The Commercial Pacific cable from San Francisco, Hawaii and Guam enters Manila, and telephone lines radiate to all parts of the large islands. The roads are generally poor and often impassable because of the severe rains that flood the streams and overflow the highways. Up to 1898 there was but one railroad and that was a narrow-gauge track from Manila to Dagupan, a distance of 120 m.; now railroads are common and more are continually being built.

PEOPLE. The natives, called Filipinos, are of a number of tribes and of all stages of civilization. They are mostly of the Malayan race, although there are also many Negritos. The latter are short in stature, but are active and muscular; they live in the forests, eating what fruits, roots and game they can secure. The Malay people, of which the Igorot is the best-known tribe, are taller, have straight black hair and copper-colored skin. Each tribe has its own customs and dialect, but since all the Filipino tribes are quick and eager to learn, they are readily adopting American ways and the English language. In religion they are chiefly Roman Catholic, although the Moros, as their name applies, are Mohammedans. Aside from the natives there are a number of Chinese, Japanese, English and Americans.

EDUCATION. Since American occupation of the islands, education has received wide attention. The system is under the direction of a secretary of public instruction and a general superintendent. There are about 40 educational districts, each having a local superintendent, a superior board and a local board. The English language is taught, and science, trades, music and drawing are among the most-sought subjects. Aside from the

elementary and secondary schools, there are normal schools, several industrial and trade schools and a large medical school. The St. Thomas University at Manila is a large school with a number of faculties.

GOVERNMENT. By act of Congress approved August 29, 1916, the governor-general is appointed by the president of the United States, confirmed by the senate, and holds office at the pleasure of the president. For legislature purposes, the islands are divided into twelve senatorial districts each of which elects two Senators to serve six years. There are ninety representative districts, each of which elects one representative to serve three years. Laws may be passed over the veto of the governor-general, but in that case they must be presented to the president of the United States for his approval, and all laws passed by the legislature are reported to the Congress of the United States which reserves power to annul the same. The judicial department consists of a supreme court, courts of the first instance, and municipal courts.

HISTORY. The first historical account of the visit of foreigners is that of Magellan, who landed on one of the smaller islands in 1521; here later he met his death at the hands of the natives. In 1543 Villalobus, an adventuresome explorer, visited the islands. This expedition gave the group their name, Islas Filipinas, in honor of the heir apparent, Filipe. From the time of discovery, the Spanish made unceasing attempts to establish themselves in the Philippines, and by 1572 they were in possession of the most of the islands. The Chinese, who had entered in great numbers, at various times attempted to gain control, and in 1662 a massacre of the Chinese upon the islands took place. This ended all attempt at Chinese domination, but the Dutch long disputed Spanish rights. In the Seven Years' War the English seized Manila but returned it to Spain under the Treaty of Paris in 1763.

From that time foreign powers left Spain in control. The Filipinos themselves, however, were not always subservient to Spanish rule and objected to the predominance of the monastic orders in the government of the islands. An insurrection in 1896, headed by Emilio Aguinaldo (See AGUINALDO, EMILIO), aimed at the expulsion of these orders. By 1897 the insurrection was supposedly quelled and Aguinaldo banished. Later he returned, and with the aid of the United States succeeded in driving out the Spaniards. The work of the United States was the destruction of the Spanish fleet in Manila Bay in May, 1898, while Aguinaldo and his followers captured the inland provinces. Aguinaldo then attempted the formation of the so-called Republic of Malolos, claiming that the United States had promised the Philippines an independent government. When the islands were ceded to the United States, Aguinaldo led an insurrection against the United States in a war lasting two years. In 1900 the Philippine Commission with Judge William H. Taft at its head established a civil government in the islands, and Judge Taft became the first governor. In spite of the difficulties met, great progress has been made in the improvement of conditions. Population: Luzon, 3,798,507; Panay, 743,646; Cebu, 592,247; Mindanao, 499,634; Negros, 460,776; Leyte, 357,641; Bohol, 243,148; Samar, 222,690. Total (in all the islands), 8,276,802.

Philip, *Fil' ip,* **the Apostle,** an early disciple of our Lord. At the time of his call he was a resident of Bethsaida. He at once invited a certain Nathanael to "come and see" if any good could come out of Nazareth, throwing interesting light on his character. He is mentioned individually in the account of the feeding of the 5000, and also took part in the introduction of the Greeks to Jesus (*John xii, 20*). The few passages of Scripture in which he is mentioned indicate that he was candid, modest and earnest, ready to receive instruction in all meekness.

Philip the Bold (1342-1404), Duke of Burgundy, fourth son of John the Good, King of France. He earned his surname when 14 by fighting at his father's side

at Poitiers, and he shared King John's captivity in England. In 1363 he received the Duchy of Burgundy, and in 1380 he became one of the regents for Charles VI. In 1384 he received the countships of Flanders, Artois and Franche-Comté, where he governed wisely and furthered commerce and arts. In 1392, when the King became insane, Philip became the real ruler of France.

Philip the Evangelist, a New Testament character first mentioned in *Acts vi, 5.* He preached at Smyrna; baptized the Ethiopian eunuch while on the road leading from Jerusalem to Gaza; and he engaged in missionary labors through all the towns along the coast of Philistia to Cæsarea. At Cæsarea, nearly 20 years later, he entertained Paul, who was on his way to Jerusalem.

Philip the Good (1396-1467), Duke of Burgundy. To avenge the murder of his father, Philip allied himself with Henry V of England against France. He quarreled with the English, however, and made a treaty with the French ruler in 1429 to assist in driving them from their French possessions. Then he turned his attention to the development of his kingdom, and at his death left Burgundy the richest state in Europe.

Philistines, *Fi lis' tins,* a Semitic people who inhabited Philistia, a long strip of land lying on the seacoast west of the hills of Ephraim and Judah and extending from Egypt to Phœnicia. The Philistines appear first in the Bible in the days of Abraham. By the time of Joshua they held five powerful leagued cities under five lords, or chiefs. Subsequently they were in constant warfare with the Israelites, but were thoroughly defeated by David, and their territory became a part of Solomon's kingdom.

Phillips, Stephen (1868-1915), an English poet, born at Summertown. His early schooling was obtained at Stratford-upon-Avon and at Peterborough; later (1886) he studied at Queen's College, Cambridge, for one term. He then joined a company of Shakespearean players, traveled through England and played in London at the Globe Theater. After leaving the stage he took up literature as a profession, and in 1897 published a volume of poems which won for him from the London *Academy* the award of 100 guineas for the best verse of the year, and established his rank among the leading modern British poets. His reputation was further sustained by the publication of his poem *Endymion* (1898). *Paolo and Francesco,* a poetic drama, was produced at the St. James's Theater in 1901, attaining great success. In this and succeeding plays the author aimed to revitalize the method of the Greek drama. His writings, aside from those mentioned, include the poems *Eremus* and *Christ in Hades;* and the plays *Ulysses, The Sin of David, Nero* and *Herod: a Tragedy.*

Phillips, Wendell (1811-1884), an American orator and reformer, educated at Harvard University and Harvard Law School. He began the practice of law at the age of 23, but his activities were soon directed along other lines. When in college he was noted for his high ideals, deep piety and wonderful command of language. Within a year from his beginning the practice of law, he saw William Lloyd Garrison dragged through the streets of Boston by a mob that was opposed to his anti-slavery sentiments. From that time Phillips devoted his energies to the anti-slavery cause. The next year he joined the Abolitionist Party and gave up the practice of his profession that he might give his entire time to advancing the cause. In 1837 he made a speech in Faneuil Hall, Boston, which at once gave him a national reputation and which has been ranked by leading authorities with Patrick Henry's oration before the Virginia House of Burgesses and Lincoln's Gettysburg Address. The speech was in reply to Hon. J. T. Austin, attorney-general of Massachusetts, who at an anti-slavery mass meeting defended the slayers of Elijah P. Lovejoy at Alton, Ill., and it was never surpassed during his entire career.

Phillips was the foremost orator of the Abolitionists, and was very influential in molding public opinion. When he began,

opposition to the cause he supported was well-nigh universal; before the end of his career, the Emancipation Proclamation had freed the slaves and slavery was abolished throughout the country by amendments to the Constitution. In 1840 he represented the Massachusetts Abolitionists at the London World's Anti-Slavery Convention. At the close of the Civil War he opposed Garrison, who believed that the Anti-Slavery Society should be discontinued since the slaves had been freed. Phillips contended that the society should continue until the negro was given the ballot. He was made president of the society and held the position until the passage of the Fifteenth Amendment in 1870, when the society disbanded.

Phillips took a leading part in numerous other reforms. He advocated the prohibition of the liquor traffic, the ballot for women, better conditions for working men and the "greenback" theory of finance. He was one of the most popular platform lecturers, and his services were always in demand at high rates, but during the anti-slavery agitation he would donate his services and pay his expenses, provided he be allowed to lecture upon his favorite theme. His platform lectures most widely known were *The Lost Arts, Toussaint L' Ouverture* and *Daniel O'Connell.* As an orator, he ranks with Clay, Everett and Webster. To serve a cause in whose righteousness he thoroughly believed, he renounced a career which held the highest possibilities of professional advancement, political power and great wealth.

"He stood upon the world's broad threshold; wide
The din of battle and of slaughter rose;
He saw God stand upon the weaker side
That sunk in seeming loss before its foes.
. . . . . Therefore he went
And joined him to the weaker part,
Fanatic named, and fool, yet well content
So he could be nearer to God's heart,
And feel its solemn pulses sending blood
Through all the wide-spread veins of endless good."

Phillipsburg, *Fil' ips burg,* **N. J.,** a city of Warren Co., 60 m. w. of Newark and 50 m. n.w. of Trenton, on the Delaware River opposite Easton, Pa., and on the Central Railroad of New Jersey and the Lehigh Valley railroads. Fine railroad bridges cross the river here. The city has good water power and excellent transportation facilities. The chief manufacturing establishments are foundries, furnaces, horseshoe works, railroad shops for three railroads, sheet-iron works, silk and pulp mills and boiler and drill works. There are also extensive coal yards. The city has many fine municipal buildings. Population in 1920, U. S. Census, 16,923.

Philo Judæus, *Fi' lo Joo de' us,* (about 20 B. C.-50 A. D.), a Jewish philosopher, born probably in Alexandria, where most of his life was spent. His family was apparently influential and wealthy. The only certain date in his life is the year 40 A. D., when he went to Rome at the head of a Jewish delegation to persuade the Emperor (Caligula) to refrain from requiring the Jews to pay him divine honors. But his teachings are well known from his extant writings. He belonged to the Jewish "dispersion," which had adopted the Greek language and much of the Hellenic civilization. Philo remained thoroughly a Jew, however, at the same time being well versed in Greek poetry and philosophy. He was especially influenced by Pythagoras, Plato and the Stoics. His attempt was to mediate between the Jewish theology and Scriptures on the one hand, and Grecian philosophy on the other. In his system God is a personal being, inconceivably good, absolutely separate from the world, and without limitations. The world is a material creation. Mediating between the two are ideas and powers, similar to Plato's, which are summed up in the Logos, or operative reason of God.

Philology, *Fil lol' o jy.* See LANGUAGE, subhead *Study of Language.*

Philosophy, *Fi los' o fy,* (from Greek *phelein,* to love, and *sophia,* wisdom;—love of wisdom), a term first used by Socrates to mean devotion to the pursuit of truth. This general meaning, however, is much too indefinite. Better than

any definition is a description of the problems that philosophy seeks to solve.

In the first place, philosophy does not find its subject matter in some vague field of its own. It deals with the concrete world about us, the same world that constitutes the subject matter of the sciences and of everyday life. To a superficial view, therefore, it would seem that the further the special sciences extend their investigations the less room is there left for philosophy. But the opposite is the true state of the case. For science and philosophy look at their subject matter from different angles. Science in the main accepts phenomena as they are presented to it, and sets itself the task of observing, analyzing, classifying and correlating what it finds. Science does not deal in any systematic way with its own presuppositions or the ultimate groundwork of nature. Philosophy, on the contrary, is the "science of sciences."

On the one hand, it examines the presuppositions that are taken for granted by the sciences (such, for instance, as the nature of space and time, assumed by mathematics, and of matter and force, by physics); and, on the other hand, it takes the conclusions reached by the various special sciences and attempts to discover their interrelations and to correlate them or "think them together" so as to form a harmonious and unitary view of the whole. In like manner, philosophy also deals with the presuppositions of life in general. It "is a process of reflection upon the presuppositions of unreflective thought."

In this attempt to reach the final meaning of things one of the first questions met by philosophy is this: How does the outside world of sense get into the mind and constitute the inside world of ideas? In other words, How is knowledge itself possible? What is its reality and what are its limitations? One main school of thinkers holds that knowledge comes by sense perception from an outer world (empiricism); while the other maintains that the certainty of knowledge is contained in the mind itself (rationalism). The consideration of these problems belongs to the development of philosophic study known as *epistemology*.

Another problem confronting philosophy is that of the ultimate ground of things, or the final nature of reality. "Philosophy as theory of knowledge thus has for its complement philosophy as theory of being." On this question, also, philosophy divides into two main streams: *idealism* finds the ultimate reality in mind itself, of which the world is but the manifestation; while *materialism* locates ultimate reality in matter, of which mind is but the corollary. This study of *being*, or the nature of ultimate reality, is known as *ontology* or *metaphysics*.

Philosophy considers, further, the value-judgments of mankind, the ideals of what humanity ought to be, in conduct, art and religion. These are as much a part of the reality of life that must be explained as are the facts of nature. In dealing with them, however, philosophy concerns itself with foundations, presuppositions and the correlation of conclusions rather than with the particulars of *ethics* and *æsthetics*, which consider these problems in detail.

Yet again, from prehistoric times men have universally had the conviction that they sustain a moral and spiritual relationship to the Absolute Being of the universe. This brings the field of religion within the jurisdiction of philosophy; not, indeed, in the form of a concrete system of doctrine, which belongs to the science of theology, but rather in answer to the fundamental questions: Is ultimate Reality personal? Is it ethical? What causes man's universal feeling of personal and ethical relationship to it? In this field, more perhaps than in any other, will philosophy attempt to discover and explain the universal order, reason and purpose which men instinctively feel must lie at the heart of things, making of the disjoined facts of life a *universe*.

After this brief survey of the field that it covers, philosophy may now be defined, in a general way, as the systematic attempt to explain the ultimate reality of things, and to think the different aspects

of life together in a consistent, unitary whole.

HISTORY. The various attempts of men to work out these problems constitute the history of philosophy. Their systems must be studied in detail to understand adequately the conclusions reached. The main periods and tendencies in the development of philosophy, however, may be given briefly. So far as it pertains to Western civilization, philosophy is generally regarded as beginning with the Greek Thales, about 600 B. C.; and is divided into three periods, ancient, medieval and modern.

Ancient philosophy is almost entirely the product of Greek thought, and may be subdivided into the Pre-Socratic period; the Socratic period, including Socrates, Plato and Aristotle; and the Post-Aristotelian period, including Neo-Platonism. Pre-Socratic philosophy was occupied with attempts to find some principle for the explanation of nature; and it ended with the Sophists, in whom it came to self-destruction through their skeptical principle of subjectivity. In the next period, Socrates converted the empirical, egoistic subjectivity of the Sophists into absolute ideal subjectivity, which grounds the world not in the individual's thinking but in universal rational thought. With him the philosophy of objective thought begins. On the Socratic foundation Plato gathered together the scattered elements of truth and built a completed system of idealistic philosophy; while Aristotle organized the special sciences on the same basis. During the Post-Aristotelian period the interest of philosophy was mainly practical and ethical. It culminated in Neo-Platonism, the final philosophic attempt of antiquity to harmonize the dualism between the subjective and the objective.

The development of medieval philosophy was determined by the new ideas introduced by Christianity, and was theology rather than philosophy. It may be divided into the Patristic period, in which philosophy cooperated in the formation of Christian dogma; and the Scholastic period, when philosophy passed into the service of theology and reduced to a system the body of dogmatic doctrine furnished to hand by the latter, using therefor the Aristotelian framework.

When Scholasticism was falling into ruins and the Renaissance had uncovered the classical literature of antiquity, when natural science was being born and the modern spirit was everywhere awakening to activity, modern philosophy had its beginnings in Francis Bacon and Descartes, being founded in the study of nature (empiricism) by the one and in the study of mind (rationalism) by the other. As a result there are two main schools of modern philosophic thought, with many gradations in between, the one standing for the position that knowledge is to be gained by observation and experience; the other, that knowledge is grounded in reason. The development is further complicated by the fact that the latter subdivides again into the two schools of *idealism* and *realism*. It seems to be true, as Fichte has said, that "there are and can be only two systems of philosophy, idealism and materialism (realism), and that neither one can directly refute the other, since they are constructed upon totally different planes." The history of modern philosophy is the attempt to reconcile these conflicting conceptions and to establish a system that shall satisfy their several demands.

The empirical line of development, starting with Bacon, was continued by Locke, Berkeley (empirical idealism), and Hume. The impetus given by Bacon, however, bore its chief fruit in the field of science, where his principle of inductive investigation became the animating spirit. In the realm of philosophy, this stream of thought mainly passes over into naturalism, materialism and agnosticism.

Modern rationalism began with Descartes, who looked to the inner nature of self-consciousness, rather than to the outer world, for the principles and certainty of knowledge ("I think, therefore I am"). He sharply separated mind from matter, and thereby bequeathed to phi-

losophy the problems that determined its subsequent development. The idealistic element in his philosophy was developed by Spinoza, Leibnitz, Berkeley and others. The realistic element allied itself with empiricism, materialism and "common sense" dualism. Kant established a new starting point in his attempt to unite the two streams by showing that while the world of "things in themselves" furnishes the data of knowledge, the mind provides the categories which convert these data into knowledge in the world of experience.

But this left still unsettled the question of the ultimate nature of reality. Three great thinkers now grappled with this problem by dropping out Kant's world of "things in themselves," and constructing systems of pure idealism which should contain both subject and object. Fichte's system is ethical and subjective idealism; Schelling's is evolutionary and objective idealism; and Hegel's is universal idealism, which attempts to be the complete system of Absolute Thought. Since the time of Hegel there has been a reaction against his philosophy, in the interest, on the one hand, of the object, or the common external world, whose reality seemed to be threatened; and, on the other hand, in the interest of the subject, or thinking mind, for which modern psychology requires more independent movement than Hegel's system allows. The old philosophic problems, therefore, are still in course of solution, with an apparent tendency back to Kant. See special articles on the men and movements referred to in this article.

Phips, *Fips,* or **Phipps, Sir William** (1651-1695), colonial governor of Massachusetts, born at Woolwich, Me. In 1684 the British Government commissioned him to search for a certain Spanish treasure ship which had been wrecked. While on a second expedition, fitted out by the Duke of Albemarle, Phips recovered the vessel, from which he secured some £300,000, his private share of the prize amounting to £16,000. Besides, he was knighted by James II and made sheriff of New England. Early in 1690 he led an expedition against Port Royal, which he easily captured, but a march against Quebec and Montreal in July of the same year ended in failure. Later Phips became the first royal governor of Massachusetts under the charter of 1690. He died in London.

Phlox, *Flox,* an erect or creeping spring and summer-blooming herb of the Polemonium Family. There are many wild and cultivated varieties which have undivided, almost stemless leaves growing opposite each other on the lower part of the stem and alternately above. The white or brightly-colored flowers grow in a cluster and are tubular, with flattened, five-lobed tops. The wild varieties grow in dry, rocky ground from New York west and south. The moss pink is a species with slender stems bearing narrow leaves which, when growing profusely, resemble moss. Gilia, a closely allied genus, has more showy flowers.

Phocion, *Fo' shi on,* (about 402-317 B. C.), an Athenian general, born of humble parents, but taught by the best masters of the time. Phocion saw the inevitable downfall of his country, and, though a true patriot, he preferred to submit to the inevitable and save the blood of his countrymen. However, he was obedient to their will, in 341 B. C. winning a victory in Eubœa, and driving Philip from Byzantium and the Chersonesus in the following year. In accordance with his conviction of what was for his country's good he advised submission to Alexander. He was misunderstood, became involved in intrigues, was condemned as a traitor, and compelled to commit suicide by drinking poison hemlock.

Phœbe, *Fe' be,* a bird of the Flycatcher Family. Somewhat larger than the English sparrow, this familiar flycatcher may be known by its dark brown head, grayish-brown upper parts and pale yellow under parts. It may be distinguished from the pewee by the absence of the white wing bars, and by its habit of flicking its tail sidewise. The peculiar song, which sounds like the syllables "phœbe, phœbe," has given the bird its

name. Originally the phœbes built their nests on stone cliffs, but the usual nesting site is now under the eaves of a house or on beams in a building. Their preference for bridge beams has given them the name of bridge pewees. The nest is a rounded structure made of moss and lichens cemented with mud. It is lined with hair and contains three to six eggs. The bird is said to build its nest near the same spot year after year. The phœbe summers in eastern North America and winters in Central America.

Phœnicia, *Fe nish' i a,* a narrow strip of coast line on the Mediterranean Sea in Asia. About 1600 B. C., when the Mediterranean was first revealed in history, Phœnician ships were already dotting its surface, and the Phœnicians continued to be the only navigators for centuries. They ventured from island to island to barter with the people or to carry them away as slaves. At last these hardy seamen brought to exchange in their cities tin from Britain, amber from the Baltic, slaves and ivory from western Africa, and spices, gold and precious stones from India. They early manufactured metals into arms, toilet articles and furniture. They were famous also as dyers.

In government they formed a loose confederation of cities with Sidon or Tyre as their leading city. They early lost their independence and usually submitted readily to the numerous conquerors of the East. Tyre remained a city of great commercial importance until it was destroyed by Alexander the Great in 332 B. C. The city was never rebuilt, and on the bare rocks where the ancient city stood the fishermen now spread out their nets to dry in the sun.

It was the peculiar mission of the Phœnicians to spread the civilization of Egypt and Babylon. Their greatest work was the invention of an alphabet of 22 letters. These letters they may have taken from the symbols of sounds from the Egyptian picture writing. All other alphabets in the world have been borrowed from that of the Phœnicians. See ALPHABET.

Phœnix, *Fe' niks,* a mythical bird of the Egyptians frequently mentioned by ancient writers. There are numerous fables concerning this bird, but the one best known is that when it becomes old the phœnix builds a nest of sweet-scented twigs, upon which it burns itself, and that a young phœnix arises from the ashes. In Greek and Roman art the phœnix is represented as an eagle, but the Egyptians represented it as a heron. By them it was regarded as the symbol of immortality.

Phoenix, Ariz., capital of the state and county seat of Maricopa Co., 194 m. s. of Ash Fork and 226 m. n.e. of Yuma, on the Salt River and on the Atchison, Topeka & Santa Fe and the Southern Pacific railroad systems. The Phoenix & Eastern, a branch road of the Southern Pacific, taps the rich mining district around Florence, Kelvin and Winkelman, and makes connection at San Carlos with the cities of Bowie and Globe. The city is a popular winter and health resort. The Salt River Valley has only two seasons, summer and winter, and from 3000 to 5000 people annually come to Phoenix to spend the winter. The city contains four electric street-car lines, and interurban lines connect with Tempe and Mesa, near-by towns. One of the best-equipped normal schools in the West is located in Tempe. Phoenix is situated on a plain in the largest agricultural section of the state, and all varieties of semitropical fruits, cereals, alfalfa and sugar beets grow in abundance. The country is irrigated by water stored in the Roosevelt Dam.

Phoenix is a modern city, with beautiful residences, wide streets and boulevards bordered with palm, date, pepper and eucalyptus trees. The most noteworthy building is the capitol, which stands in a stately inclosure. Other buildings include a Federal Building, city hall, a Y. M. C. A., banks, theaters, two city clubs, a country club, hotels and about 12 churches. The educational institutions include the Arizona School of Music and Lamson Business College. There is an excellent system of public schools,

with a high school which cost $50,000. A few miles north of the city is the Phoenix Boarding School for Indians, supported by the Federal Government. A United States Experiment Station is located near the city limits on the northwest, where all the products of the section are tested. The important industries include beekeeping, ostrich raising, livestock raising and market gardening. An annual state fair is held in November. Phoenix was first settled in 1870, incorporated in 1881 and became the capital of Arizona in 1889. Population in 1920, U. S. Census, 29,053.

Phoe'nixville, Pa., a city of Chester Co., 28 m. n.w. of Philadelphia, at the junction of the Schuylkill River and French Creek, on the Philadelphia & Reading and the Pennsylvania railroads. The town is an important center of the iron industry and has extensive ironworks, among the largest in the United States, turning out iron bridges, rails, architectural and structural iron, boilers, etc. There are also manufactories of silk, hosiery, matches, underwear and cotton goods. The town was settled in 1792 and the borough incorporated in 1849. There are good schools, a hospital, public library, etc. Population in 1920, U. S. Census, 10,484.

Phonetics, *Fo net' iks,* or **Phonology,** *Fo nol' o jy,* in its broadest sense the science of sounds, but in its ordinary application the science of sounds pertaining to articulate speech and the art of representing these sounds by written symbols. The sounds of the human voice are divided into two classes, those produced by the vibration of the vocal cords alone, represented by the vowels *a, e, i, o, u, y,* and the articulate sounds produced by the use of the palate, tongue and lips and represented by the consonants. The English language has 40 elementary sounds, while the alphabet has but 26 characters. Several letters, therefore, must represent more than one sound, as is the case with *a, e, i, o, u* and *y.* This makes our language difficult for foreigners to pronounce and more or less difficult for all to spell (See SPELLING). Since the elementary sounds constitute the foundation of articulate speech, they should be correctly taught as soon as the child can understand them.

Phonograph, *Fo' no graf,* a device perfected by Thomas Edison in 1877 for the purpose of recording words and other sounds and reproducing them. Leon Scott had previously demonstrated that words spoken into a hollow vessel, provided on its lower side with a flexible bottom of membrane carrying a stylus impinging against a cylinder covered with tin foil, could and did record and produce articulate sounds. Edison improved this device in several ways, chiefly by first substituting a cylinder covered with wax. This revolves against a sharp needle point attached to a flexible metallic diaphragm vibrated by the impulses of the voice, and cuts into the wax small grooves or indentations. This diaphragm is mounted on a carriage and travels the entire length of the cylinder, and the grooves are therefore cut spirally around the cylinder its entire length.

In order to reproduce the sounds, the cylinder is made to rotate again, and a blunt needle is attached to the diaphragm and follows the grooves made by the former needle. The result is a series of vibrations, which exactly reproduce the sounds. These are made audible by the use of a horn, trumpet or ear pads. Motion is usually imparted to the cylinder by means of a spring, but in some instances an electric motor is used. A governor is usually attached to the machine to secure uniformity of motion. By employing a knife on the carriage the grooves are shaved down and the cylinder is ready to be used again. By electrotyping and other methods these cylinders can be duplicated many times. Another form of phonograph employs a disk of rubber revolving in a horizontal plane, and operates in a similar manner. The record is made on the disk while it is soft, and afterwards the rubber is hardened. In the more up-to-date machines the horn is discarded, and a chamber under the machine is provided with a sounding board similar to that of a

pianoforte. These instruments are remarkably accurate in the reproduction of musical tones.

Phonographs are extensively employed in reproducing songs, music, etc., for entertainment. They have been employed to preserve the dying languages and the speech of monkeys in the wilds of Africa, and records have been made for the preservation of the speech, songs, war cries and much of the folk lore of the American Indians. Automatic phonographs, operated by a coin in the slot, are found in many public amusement halls, where popular songs, music and speeches are reproduced. A modification of the phonograph has been applied to the telephone to preserve records of speech, but it is not in general use. The term *gramophone* is also applied to the phonograph.

DICTAGRAPH. A simple form of phonograph, called dictagraph, is employed in offices for dictating letters and other matter to be transcribed by typists who read the letters by means of ear pads. Ingeniously constructed forms of the dictagraph are also employed by detectives to entrap criminals. These machines are easily concealed in a room or on one's person, where they record any conversation that takes place near them.

Phosphate, *Fos' fate,* **Rock,** a rock composed of calcium phosphate, calcium carbonate and other minerals. When a large percentage of phosphate is present, it is valuable as a fertilizer. It is found in the northwestern and southeastern parts of the United States and in Arkansas. It occurs in clayey, gravelly or compact beds below the surface soils and in the beds of rivers. A variety of oolitic phosphate occurs in Tennessee. See FERTILIZER.

Phosphorescence, *Fos" for es' ens,* the property which is possessed by certain substances of emitting or giving off light after they have been exposed to light. The substances which show phosphorescence most brilliantly are the sulphides of barium, calcium and other alkaline earths, and diamonds and sugar. The light sometimes seen in the sea is not properly phosphorescence, but is due to the light emitted by myriads of minute sea animals.

Phosphorus, *Fos' for us,* a widely distributed element never found free in nature because of its great affinity for oxygen. It was discovered in 1669, but the method of preparing it was long kept secret, as it was believed to be an especially choice element. Its salts are found in all plants and are, in fact, essential to their life; they are also constituents of all fertile soils and therefore of many artificial and natural fertilizers. In animals the phosphates, or salts of phosphorus, are found in large quantities in the bones and to some extent in the brain. Pure phosphorus occurs in two widely different forms. The more common is the crystalline, yellow variety, tough and soft at ordinary temperatures. In the light it becomes coated with a nontransparent, reddish covering, into which, on continued exposure, the entire substance is transformed. Phosphorus, in the absence of light, has the power of radiating light, which, however, is a quality not confined to this substance. Phosphorus is sold in the market in candlelike sticks and must always be kept under water or petroleum and preferably in the dark. It is poisonous, and habitual exposure to its fumes causes disease. The second form in which it appears is a red powder which has neither taste nor color and is not poisonous. The salts of phosphorus are used to some extent in making matches and signal lights for use at sea.

Photo-Engraving, *Fo" to-En gra' ving,* a process of engraving by the use of photography. The process depends upon the properties of gelatin and some other substances to undergo certain changes when exposed to the light. If albumen or the white of eggs is mixed with a solution of bichromate of potassium and exposed to light, it will become insoluble in cold water, while, if not exposed to light, it remains soluble. Therefore, if a copper or zinc plate is covered with a coating possessing these properties and acted upon by light through a negative, then washed in cold water, a positive of the picture is transferred to

the coating. This gelatin surface protects the plate from the action of acid, and when the plate is immersed in acid, those parts from which the gelatin has been washed away are etched, and in this way the picture is transferred to the metal. After etching, the plate is cleaned and mounted on wood to make it type high. It is then ready for printing. See HALF TONE; PHOTOGRAPHY; ZINC ETCHING; LITHOGRAPHY.

Photography, *Fo tog' ra fy,* the art of drawing or writing by the action of light on a sensitized surface.

HISTORY. Scheele, a Swedish chemist, in 1777 established the fact of the action of light on certain salts of silver, while Joseph Niepce, in about 1813, took the first photograph on tin plates prepared with a coating of bitumen. Daguerre, a Frenchman, in connection with Niepce, perfected a process of photography in 1838, using a highly polished copperplate, coated with silver iodide, which after exposure to light was developed in mercury vapor. These pictures were known as daguerreotypes. About this time H. F. Talbot in England discovered that silver chloride could be used, and he employed sensitized paper and printed proofs from negatives practically as it is done today, thus laying the foundation of modern photography.

PROCESSES. Photography includes three processes: exposing the plate, developing the negative and printing the positive. The plate consists of a glass or a celluloid film, having one surface covered with gelatin emulsion, which consists of a layer of gelatin and finely-divided silver bromide, a substance very sensitive to light. The manufacture of the plates and films is a business by itself, and photographers purchase them ready for exposure. Glass plates are in general use in studios, but films are more convenient for tourists, since they occupy less space and are of much less weight. The films are in the form of ribbon and are wound upon spools which fit the camera. Each spool contains a given number of exposures and each exposure is indicated as the spool is unwound.

Exposure. In order to obtain a good picture the operator must use care in making and timing the exposure. The plates are generally marked to designate the required time of exposure, and may be ordinary, rapid or extra rapid, depending upon the class of work. Care must be taken to adjust the camera so as to get the proper focus. It must also be placed so that the light will fall upon the object and so that there will be no sharp contrasts of light and shade. The intensity of the light governs the time of the exposure to a large degree, the length of which is learned only by experience.

Development. Development is the operation of making visible the latent image which the light has produced on the plate, and the various chemical solutions that will do this, of which pyrogallic acid is an example, are called developers. Since light darkens the plate (on development), white objects which reflect the most light will appear black, and black objects will appear white; hence a negative, in which the lights and shades are reversed, is obtained. The development is done in a dark room fitted with shelves for holding the necessary chemicals and frames for the negatives. The room should contain a sink with running water and be dimly lighted with a light shaded by a ruby-red or orange-colored glass, or slightly illuminated by a red-glass lantern. The negative is soaked and washed in a chemical solution. The names and combinations of chemicals used as developers are numerous. After development, any silver bromide which has not been affected by light is washed away in a bath of hyposulphite of soda, and the plate is then regarded as fixed, when it may be examined in daylight. Finally, it is thoroughly washed and dried, when it may be used for printing.

Printing. The common method is to place the negative in a wooden frame with the film uppermost. Under this plate is a piece of sensitized paper made by coating it with a preparation which will darken on exposure to light. When exposed to the light a positive is printed on the paper. Since the unshaded por-

tions of the negative allow free passage of light and the shaded portions restrict the passage, the dark parts of the photograph correspond to the light portions of the negative and the light portions to the shaded portions of the negative. Sunlight or electric light can be used. After removal from the frame, the print is washed in a chemical solution, sometimes in one containing gold, which fixes the picture permanently and causes it to tone up or have a more pleasing color. After the print has been washed and dried, it may be pasted on a suitable cardboard or mount, or left unmounted at the option of the photographer.

Applications. Besides the taking of pictures or making portraits, photography is employed in several fields of science. Among the most important is that of producing by microphotography the minute forms of life too small to see with the naked eye, and that of photographing the heavens, by which the study of astronomy has been advanced. In disputes and in legal matters, the photographing of documents and signatures has been valuable for the detection of fraud by showing forgery. Photographs from balloons and aeroplanes have proved quite valuable for military purposes, and in warfare for locating forts, strongholds, ships, etc. The making of pictures for the cinematograph (See Moving Pictures) also represents an important field in photography. See Half Tone; Photo-Engraving; Photogravure; Lithography; Zinc Etching.

Color Photography. The one step needful to make color photography possible was the discovery of the power of certain dyestuffs to make a photographic film sensitive to all visible colors. This has been accomplished in several ways, but what is known as the Lumière process, from the name of its discoverer, is in most general use. A layer of minute starch grains, some of which are colored red, some green and some blue, is embedded on the surface of a glass plate in a waterproof mixture. This is covered with a film of sensitive emulsion. The plate is placed in the camera with the back next the lens. The light passing through the colored granules produces a negative, which is converted into a positive that reproduces faithfully the colors of the object. The greatest obstacle to the commercial success of this process was the inability to print from the negative, as in ordinary photography. This has recently been overcome in a great measure by the preparation of a special printing paper containing aniline colors. When exposed to the sunlight, the plate acts upon the paper in such a way as to reproduce the colors in the print the same as in the positive on glass.

In the so-called three-color printing process, half tones are prepared from negatives obtained by exposure through colored screens, and the picture is produced by printing from these half-tone plates one impression after the other, each carrying a different color. The colored illustrations in this work are produced by this process.

Photogravure, *Fo" to gra vure',* a process of engraving which combines photographic methods with etching on plates for printing. The term is frequently applied to the picture produced. The process consists of having a photograph made on glass, which is placed in a reversed position on a copperplate covered with bituminous varnish. The glass is exposed to light, whereby those portions of the varnish affected by the light are rendered insoluble, and those in the shadow are unchanged. Afterwards the varnish is dissolved and the markings on the plate are etched with biting acids. The plate thus made is sometimes retouched with a steel graver. It is then put on a printing press similar to that used in copperplate printing, where especially fine inks and paper are used. Reproductions by this process are equal to the finest steel engravings. See Half Tone; Engraving; Photography; Etching.

Photometer, *Fo tom' e ter,* an instrument for comparing the strengths of two lights. The two simplest photometers in use are the Rumford and the Bunsen.

The Rumford photometer consists of an opaque rod held a few inches in front of a white screen. The two lights to be compared are placed so that the shadows of the rod they cast upon the screen will be side by side, and one light is moved nearer or farther away from the screen until the two shadows appear equally dark. The strengths of the two lights are then to each other as the squares of their respective distances from the screen; if one light is three times as far from the screen as the other, it is 3^2, or 9, times as strong. The Bunsen photometer consists of a screen of unglazed white paper with a small spot of oil or paraffin in the center. The two lights to be compared are placed on opposite sides of this screen, and their distances from the screen adjusted until the oiled spot no longer shows or until it looks the same from both sides of the screen. The strengths of the two lights are then proportional to the squares of their respective distances from the screen, as in the case first described. In both cases the room where the comparison is made should be darkened.

It is usual to express the strength of a light in terms of *candle power,* a candle power being defined as the light emitted by a sperm candle seven-eighths of an inch in diameter and burning 120 grains of sperm per hour. An ordinary gas flame burning five cubic feet per hour has a strength of 15 to 25 candle power; a Welsbach mantle using three cubic feet per hour has a candle power of 50 to 100; and the ordinary carbon-filament electric incandescent light taking .5 ampere at 110 volts, a candle power of 16. See LIGHT.

Photom'etry, the science or art of measuring the strength of lights. See PHOTOMETER.

Phrenology, *Fre nol' o jy,* the name of a theory, once advanced almost to the place of a science, which held that the prominences upon the skull indicated the development of various faculties of the mind. It was originated by Franz Gall, a German physician (1758-1828), who, in company with a Dr. Spurzheim, made a chart of the brain which, they claimed, was made up of 42 separate organs, each the seat of a distinct mental power. From this they reasoned that an individual's characteristics could be determined by the examination of the head. Phrenologists, armed with Dr. Gall's chart, gave lectures and examined the heads of those who offered themselves for inspection. The prominence first given phrenology was short-lived, but it paved the way to the study of the brain in its physical structure as well as its mental attributes, and it was probably the foundation of the present knowledge of the location of different mental and physical powers in the respective brain centers. Consult Hudson, *Brain and Personality.*

Phrygia, *Frij' i a,* a country in the western part of Asia Minor. Since ancient history its boundaries have varied greatly, and its territory has been largely reduced. The Phrygians are thought to have been an Indo-European race entering Asia Minor from Thrace. They were peace-loving and devoted their energies largely to cattle raising and agriculture. Races of their legendary kings, called alternately Gordius and Midas, have become well known.

Phylloxera, *Fil" ox e' ra,* a destructive insect of the Aphid Family which has done great damage to wine grapes. It is native in North America, where for years it has lived, seemingly without doing damage, upon the roots and leaves of the wild grape. Through the selling of cuttings the phylloxera was introduced into France, where it immediately became a serious pest and is said to have destroyed one-third of the vineyards in France. By a curious chance this pest returned to California from France by the same means and has worked corresponding harm to the wine grapes there.

The phylloxera has a peculiar life history. The eggs develop usually in July or August, and the resulting insects are winged insects larger than their parents and very different in habits. Their powers of flight are not great, but they are often carried some distance by the wind; those which reach a grapevine crawl be-

neath the leaves and there deposit two eggs of different sizes, the smaller of which produces males, and the larger, females. These live only through the autumn, but long enough for the female to deposit under the bark of a two-year old vine a single winter egg, which does not hatch until the following spring. The insect which comes from this egg has the choice of one of two modes of existence: it may go to the new leaves and become a gall maker, capable of very rapid multiplication; or dig to the roots and live by sucking the sweet sap from them. In either case vines so attacked begin to lose their strength and become sickly, yielding but little fruit and that of poor quality. After three or four years the vines can resist no longer and succumb to the attacks of a constantly multiplying enemy.

The root or gall insects reproduce for several years before again producing the egg from which the winged insect emerges. Through this time they are tiny yellowish, freely-moving insects, but at the time of egg laying they become fixed like the scale insects. The harm that the phylloxera does is not from sucking the juices so much as from producing a cancerous wound, which is the immediate cause of the plant's death.

No satisfactory method has been found of combating the attacks of the insect. A race of vines can be grown in Missouri in spite of the phylloxera, and wine grapes grafted upon these are immune. This method is now being used in France and California. If a vineyard can be kept under six inches of water for six weeks, the insects are smothered out, and carbon disulphide mixed with the soil about the roots also often proves efficacious; this latter method is, however, very expensive and is useful only in rich, deep, loose soils. Vines which begin to show signs of attack should at once be pulled up and resistant vines put in their place.

Physical Culture, *Fiz' i kal Kul' ture,* training by which the physical powers may be wisely and harmoniously developed. Physical culture demands reasonable regularity in one's habits; sufficient sleep, preferably in the open air; a suitable and well-balanced diet, special attention to the thorough mastication of food, habitual restraint against overeating and the complete elimination of both stimulants and narcotics; also that the digestive processes and the elimination of broken-down tissues shall be furthered by the drinking of a reasonable quantity of pure water at and between meals. It demands regular recreation, whenever possible in the open air, through such a variety of athletic games and exercises that no set of muscles shall be neglected, and none unduly developed.

Physical training makes the same demands as physical culture. The latter term is, however, more commonly used in speaking of methods specially adapted to men of mature years or to the needs of women and children. Delsarte, the so-called Swedish movements and light gymnastics may be included under either. The beneficial effects of physical culture have been strikingly evident (a) in the case of elderly business men, by increasing their vigor and lengthening the period of their active participation in business affairs; and (b) nowhere, perhaps, to a greater degree than among the women of America, who today are giving more and more heed to its teachings, and thus winning recognition as the physical as well as the mental equals of their brothers.

Physical Geography, that department of geography which treats of the surface of the earth and those forces which are constantly at work producing changes on the surface, such as the atmosphere, wind, rainfall and erosion. Physical geography is, therefore, somewhat complex and is naturally divided into the following departments:

Climatology. This treats of the atmosphere and of temperature. When considered solely in its relation to the weather, it becomes meteorology. See Atmosphere; Meteorology; Rain; Wind; Weather Bureau.

Hydrography. The department of hydrography is concerned with the study

of the sea, including all branches of the ocean and the coast waters. It also includes the study of tides and marine currents. See CURRENTS, MARINE; TIDES.

PHYSIOGRAPHY. Physiography treats of the changes on the earth's surface and is nearly identical in scope with surface geology. In the United States some authorities use the term synonymously with physical geography. See EROSION.

LIFE. Animal and vegetable life are dependent upon the conditions described in the foregoing departments, and the last work of physical geography is to treat the distribution of life upon the earth and to show the dependence of the animal and vegetable kingdoms upon these conditions. Since man is the crowning work of creation, special attention is given to the races of men, their distribution, habits of life and industries, all of which depend upon geographical conditions.

Physics, *Fiz' iks,* that department of science which deals with material things and the forces that govern them. It was formerly spoken of as natural philosophy and included the sciences of chemistry, biology, zoology, astronomy and geology. Since these last-named sciences have been removed from the domain of physics this science has concerned itself more particularly with the laws (except chemical changes) of matter and energy, and is sometimes spoken of as the science of energy transformations. It is divided into the departments of mechanics, heat, light, sound and electricity, each of which is treated under its respective title. See also PNEUMATICS; MAGNETISM; ELECTROCHEMISTRY; ELECTROLYSIS; THERMOELECTRICITY; DYNAMICS; ELECTROMAGNET.

Physiography, *Fiz" i og' ra fy.* See PHYSICAL GEOGRAPHY.

Physiology, *Fiz" i ol' o jy,* the science which treats of the properties of living bodies, whether plant or animal, and which seeks to discover and accurately describe their functions. When limited in its application to the human body, as in the following article, it is spoken of as human physiology. The growth of physiological science is closely associated with the development of anatomy, chemistry and physics; and so great has been its dependence upon those sciences and so close its relationship with them that only in recent years has physiology been regarded as an independent science. Some attempts were made by the Egyptians and Chinese to understand the human body, but their efforts were tentative and superficial. Hippocrates (460-357 B. C.), called the "father of medicine," was the first of them to practice medicine upon principles of inductive philosophy; that is, by formulating a theory on the basis of copious records of symptoms made during the progress of disease. Aristotle, his contemporary, sought to understand the body by dissecting the bodies of lower animals and drawing analogies therefrom; and his studies, though inaccurate, were far in advance of the work of his predecessors and led to other anatomical researches, which resulted, in the second century, in the work of Galen, the first experimental physiologist who utilized the facts of anatomy as revealed by dissection. In the 17th century the circulation of the blood was discovered by William Harvey; the physiology of nutrition and secretion and the reproductive functions received valuable contributions; and discoveries in chemistry, which gave impetus to the work, were made.

The 19th century, however, marks the period of most brilliant achievement. A knowledge of the chemistry of digestion and secretion, of the mechanism of circulation and respiration, and of reflex action was acquired; the cell and "neurone" doctrines were developed; and the functions of the brain and accessory organs were more accurately determined. The infinite patience, heroism and arduous labors which have brought about these achievements cannot be estimated. See CIRCULATION; RESPIRATION; NERVOUS SYSTEM.

Pian"ofor'te, a musical stringed instrument played by striking the strings with hammers that are operated by striking keys arranged on a keyboard. The

pianoforte is the outgrowth of the clavichord and the harpsichord. The first instruments were built by an Italian, Bartolommeo Christofori, in 1709. Compared with the piano of the present day, they were very crude affairs. The improvements that have brought the piano to its present degree of perfection extend over two centuries and are due to the genius of a number of musicians and mechanics.

A piano has certain essential parts. The frame is usually made of cast iron and is in one piece; the string plate, to which the strings are fastened, is attached to the rear end, and in front are the tuning pins, around which the other end of the strings are wound. By turning these pins the tension of the strings is regulated. The sounding board is a thin board placed under the strings to strengthen the tone. The strings, which are made of steel wire, vary in length and size to suit them to the different tones. The short small strings produce the high treble, and the long heavy ones the low bass. The strings for the bass are made heavier by winding them with fine copper or brass wire. For the lowest tones only one wire is used; for those next higher, two; and for the highest, three. The action consists of the hammers, levers and keys by which the instrument is played. The hammers are tipped with felt, and dampers are placed on the opposite side of the strings to soften the tone. By means of the pedals the tone may be made loud or soft. Modern pianos have three pedals, one for increasing the volume of sound, one for diminishing it, and a third which raises the damper only over certain keys. Pianos are now made in two styles, the upright and the grand, the former being in most general use. The compass of the piano is now by universal adoption for seven and one-third octaves.

Piano Player, a device for playing the piano automatically. There are numerous patterns but all are on practically the same principle. By means of a bellows air is drawn through perforations in a roll of paper in such manner as to cause the hammers to strike the strings. A controlling device enables the player to regulate the tempo and tone shading with pleasing results. The perforated rolls used are records of actual piano playing. Improvements in piano players are being constantly made and beauty of design in the instrument attained.

Pick'ens, Andrew (1739-1817), an American soldier and partisan leader, born at Paxton, Pa. He removed to South Carolina in 1752, fought in the Cherokee War in 1761, as a lieutenant, and in the Revolutionary War became brigadier-general of the South Carolina militia. Throughout the conflict he commanded an independent partisan band, distinguishing himself at the Cowpens and Eutaw Springs. Pickens was in the State Legislature from 1783 to 1794, sat in the Federal Congress one term and returned to the Legislature in 1801 and in 1812. He treated with the Indians on several occasions.

Pickens, Francis Wilkinson (1805-1869), an American statesman, born in Togadoo, S. C., and educated at South Carolina College. In 1832 he entered the State House of Representatives, where he submitted a report denying that Congress had the right to control the states, from 1834 to 1843 he was a member of Congress, the following year he served in the South Carolina Senate and in 1850 he was a delegate to the Nashville Southern Convention. For two years Pickens acted as United States minister to Russia, but he returned to America at the opening of the Civil War and from 1860 to 1862 was governor of his state. He advocated secession, and signed the South Carolina ordinance. After his governorship he retired to private life.

Pick'erel, a fresh-water fish of the Pike Family, common in the United States, where it is often confused with the pike. Its chief point of difference is the presence of scales upon cheeks and gill covers. The three species of pickerel most common are: the eastern, never found west of the Alleghenies; the western, found only west of the Alleghenies; and the banded, found only in the coastal

states of the Atlantic. All have large mouths and firm, finely-marked bodies. By the boys, they are considered excellent both as game fish and as food fish, but the older angler is apt to pass them by. They are to be found feeding upon seaweed, frogs and small fishes in all the lakes and ponds of the Mississippi region.

Pick'ering, Timothy (1745-1829), an American statesman, born at Salem, Mass. He was educated at Harvard, and, after studying law, was admitted to the bar. He was prominent in early patriotic movements and served in the Revolutionary army. In 1791 he became postmaster-general of the United States, and in 1795 was appointed secretary of war, in which capacity he established the military academy at West Point and increased the strength of the navy. He then became secretary of state, serving until 1800. Removing to Massachusetts, he was chosen chief justice of the Court of Common Pleas, and became United States senator in 1803. He served in the House of Representatives from 1811 to 1817.

Pick'ett, George Edward (1825-1875), an American soldier, born in Richmond, Va., and educated at West Point. He distinguished himself in the Mexican War, participating in many of the important actions, and on the western frontier; but in 1861 he resigned from the United States army and became a colonel of Virginia State troops. Having been promoted brigadier-general under Longstreet in 1862, he soon was made major-general, because of services in the Peninsula Campaign. He was present at Fredericksburg; and at Cemetery Ridge, in the battle of Gettysburg, he led the famous charge which bears his name and which is probably the most brilliant feat in Confederate annals. Later, in May, 1864, his defense saved Petersburg. Following the war he entered business in Richmond.

Picric, *Pik' rik,* **Acid,** an acid which has been used as a yellow dye since 1771. It was then prepared by the action of nitric acid on indigo. Later it was made in the laboratory by Welter and was called Welter's bitters. In 1842 it was first prepared from carbolic acid, from which it is still obtained for commercial purposes. Picric acid is a yellow, odorless solid, the crystals of which are plate-like in form. It has an intensely bitter taste and its solution gives a beautiful yellow tint to silk and wool, on which materials it is used as a dye. The familiar yellow stain made by nitric acid is caused by the formation of picric acid.

Picts, the ancient inhabitants of Great Britain. They were of low stature and dark complexion. The Romans constantly made war upon them and built walls to keep them out of conquered territory. They were driven northward into Scotland, but with the conquest of the island by the Teutonic nations they were gradually absorbed into the English nation, and about the middle of the eighth century ceased to exist as a separate people. Their language is extinct and they left no literature.

Pidgin, *Pij' in,* **Charles Felton** (1844-), an American writer, statistician and inventor, born in Roxbury, Mass. In 1873 he became chief clerk of the Massachusetts Bureau of Statistics of Labor, and chief in 1903. He has invented an electrical adding and multiplying machine, an addition register, a self-counting tally sheet, an automatic multiple tabulating machine and many other appliances for tabulating statistics. His versatility is further shown by his writings, which include librettos for a number of musical comedies and cantatas, the words for over 60 songs, several magazine articles and the novels *Quincy Adams Sawyer and Mason's Corner Folks* and *Blennerhasset, or the Decrees of Fate.*

Pied-Billed Grebe, *Pide-Billed Greeb.* See HELL-DIVER.

Piedmont, *Peed' mont,* **Region,** a name given to that part of the Atlantic Coastal Plain lying between the Appalachian highland and the Coastal Plain proper. It consists of older and harder rock strata than the latter, and is more rugged and marked by deeper river val-

leys. The line of demarcation between the two plains, an elevation known as the "fall line," is crossed by numerous rivers which here take the form of cataracts and waterfalls. The Piedmont Plain is not so well defined in New England as in the Southern States; in the latter it reaches a width of 300 m. in places. It is narrowest in the State of New York.

Pie'plant". See RHUBARB, *Roo' barb.*

Pierce, *Peers,* **Franklin** (1804-1869), fourteenth president of the United States, born at Hillsborough, N. H. He graduated from Bowdoin College in 1824, was admitted to the bar in 1827 and began practice in his native town. In 1829 he was elected to the State Legislature, where he served for four years, the last two as speaker. From 1833 to 1837 he was a member of the House of Representatives, after which he entered the United States Senate, where he remained until 1842. He then resumed the practice of his profession in Concord whither he had removed four years earlier. At the outbreak of the Mexican War in 1846 Pierce enlisted as a private, but was soon made colonel, and then brigadier-general. He served with distinction, entered Vera Cruz with General Scott's victorious army, and came home a popular hero.

He was nominated for the presidency of the United States in 1852 by the Democratic Party as a compromise candidate, and was elected by a large majority over his former commander, General Scott. During his administration the Kansas-Nebraska Bill of 1854 was passed. In the same year was ratified a treaty with Mexico, providing for the purchase of land known as the Gadsden Purchase. The honor of the American flag was maintained abroad, and Commodore Perry negotiated a commercial treaty with Japan in 1854. At the close of his administration Mr. Pierce made an extended tour of Europe, returning in 1860, when he retired to his home at Concord and took no further part in political life. Hawthorne wrote his biography.

Piers, *Peerz,* **the Plowman.** See LANGLAND, WILLIAM.

Pigeon, *Pij' un.* The domestic pigeon is a descendant of the rock pigeon, a common European bird. This rock pigeon is about 11 inches long, and is grayish-white, with green and purple metallic reflections on the neck. The lower part of the back is white; there are two black bars on the wings; and the tail has a terminal band. In a wild state this pigeon nests upon rocky cliffs, especially near the sea. There are upwards of 250 varieties of the domestic pigeon, which differ from each not only in color, but even in the structure of the skeleton. Among these varieties are the pouter, carrier, tumbler, fantail and trumpeter pigeons.

Pigeon Hawk. See MERLIN.

Pigeon Woodpecker. See FLICKER.

Pig'ments, a general term employed to denote a large variety of substances which form the body and carry the coloring matter of paints. White lead and oxide of zinc form the body of most of the oil paints and carry a color of white. To either of them may be added various minerals containing coloring matter. Lampblack, bone black and graphite produce black; sulphide of mercury, vermilion; and cobalt, blue. Many brown and yellow pigments are made from ores containing clays. Chromate of lead is very much used for yellow colors. Green is usually obtained from the salts of arsenic or copper. In water colors cochineal for red and indigo for blue were formerly used, but they have been superseded by the colors obtained from the products of coal-tar distillation. See PAINT; WHITE LEAD; LAMPBLACK; GRAPHITE; COBALT; ARSENIC; COPPER; COCHINEAL; INDIGO; COAL TAR.

Pig'weed", a coarse weed of the Amaranth Family, having an erect, rough stem and long, coarse leaves, often covered with bristly hairs. The plant is common in gardens, along roadsides or on any cultivated ground, and is persistent, as the root is tough and hardy. The flowers are green or greenish-white and grow in a closely-crowded spike, surrounded by stiff, sharply-pointed bracts. The flowers are so small as to

be very inconspicuous, and so stiff and rigid as to be practically everlasting. Pigweed often grows to a height of from two to three feet, and is often known as the green amaranth.

Pike, a small family of fresh-water, food and game fish, not especially prized though of importance to young anglers. All members of the family have long, slender bodies, small scales and large mouths, filled with sharp teeth. They are greedy, destructive fish, eating their neighbors and even prizing young ducklings and small beach or marsh birds. The large eyes may frequently be seen just below the surface, watching motionless the approach of its prey. There are but five species of pikes, all of which are found in the United States and but one known in European waters. The muskellunge, true pikes and pickerel are among the best known of the family.

Pike, Zebulon Montgomery (1779-1813), an American soldier and explorer, born in Lamberton, N. J. When he was 15 years of age he was a cadet in his father's regiment, was ensign at 20 and first lieutenant at 21. Five years later he set out to explore the new Louisiana Purchase. He returned the next year and went out again, up the Missouri and Osage into Kansas, and south to the Kansas River, which he ascended to where Pueblo, Colo., now stands. In 1806 he was made captain, two years later major, lieutenant-colonel in 1809 and colonel in 1812. The year following he was nominated for brigadier-general. He was killed in the expedition against York, Canada, in 1813. Reports of his various travels have been published, and Pike's Peak, in Colorado, which he discovered, is named for him.

Pike Perch. See PERCH.

Pike's Peak, a peak of the Front Range of the Rocky Mountains, in El Paso County, Colo., 6 m. from Colorado Springs. Its summit is 14,109 ft. above sea level. Its sides up to about 12,000 ft. are covered with forests of fir and pine. Snow remains on the summit throughout the summer. The mountain is ascended by a cog-wheel railway and is visited by many tourists. A station of the United States Weather Bureau is maintained on the summit.

Pi'late, Pontius, the Roman governor of Judea, Samaria and Idumea at the time of the crucifixion. He ruled from 26 to 36, when he was deprived of his office. Aside from his connection with New Testament history, he is known to have been a thoroughly unsympathetic ruler, caring nothing for the religious feelings of the Jews and thinking as little of his Samaritan subjects. He was deprived of his office for setting his troops upon an assemblage of Samaritans on Mt. Gerizim. See SAMARITANS.

Pil'chard. See SARDINE; MENHADEN.

Pilcomayo, *Peel" ko mah' yo,* a river of South America, also called the Araguai. It rises in the south-central part of Bolivia, flows in a southeasterly direction and enters the Paraná. Its length is about 1300 m. The Pilcomayo forms the western boundary between Paraguay and Argentina.

Pil'grims, or **Pilgrim Fathers,** a name first given by William Bradford to the Separatists who fled from England to Amsterdam and then to Leyden, Holland, 1609, and, coming to America in 1620, made the first English settlement in Massachusetts at Plymouth. See PLYMOUTH COLONY; MASSACHUSETTS, subhead *History.*

Pill'ory, a wooden frame erected on posts for the punishment of criminals. It consisted of two parallel boards joined by sliding hinges and arranged like a signboard. A circular hole in its center, in the line of junction of the two boards, received the neck, and two smaller holes on each side of it the wrists. The pillory was abolished in England in 1837. It was also a common punishment in America during colonial days, but was revoked in 1839 in all the states except Delaware.

Pil'low, Gideon Johnson (1806-1878), an American lawyer and soldier, born in Williamson County, Tenn. He graduated from the University of Nashville, studied law and rose rapidly in his profession, having begun to practice in 1828 in Columbia, Tenn. At the outbreak of

the Mexican War he became brigadier-general in command of Tennessee volunteers, and, having joined General Scott at Vera Cruz, distinguished himself throughout the war, advancing to the rank of major-general. He was acquitted of charges of insubordination preferred against him by Scott, and returned to his law practice until entering the Confederate army, as brigadier-general, at the opening of the Civil War. At the Battle of Belmont he opposed Grant, and at Ft. Donelson he was second in command, but escaped before the garrison surrendered.

Pills'bury, John Sargent (1828-1901), an American merchant, manufacturer and statesman, born at Sutton, N. H. In 1855 he moved to Minneapolis, Minn., where he engaged in the hardware business. He also carried on an extensive lumber business, and, later, was associated with his brother, Charles A. Pillsbury, in the largest flour manufactory in the world. He served his state in the Senate for 12 years, and as governor for six years. He was a regent of the state university for 40 years. While he was governor he secured the payment of the state debt which had been repudiated. Science Hall at the University of Minnesota is his gift.

Pi'lot Fish, a marine fish of the Pampanos Family. It is found in the seas about Europe, the West Indies, Hawaii and Japan, and is recognized by its short, deep body, marked by six black cross-bands. In old age the rays of the dorsal fin become separated and form a row of disconnected spines upon its back. In internal structure the pilot fish has few vertebræ and those of above normal size. This fish has received its name because it is said to precede sharks in their pursuit of vessels and, with them, feed upon the refuse from the boats. The average pilot fish attains a length of two feet.

A species of whitefish found in the Great Lakes is locally known as pilot fish.

Pimen'to. See ALLSPICE.

Pim'pernel, a low herb of the Primrose Family, brought from Europe for garden cultivation; one species has escaped and become a wild flower of sandy fields. This species is a spreading plant with light green leaves and red, purple or white flowers, which, because they are supposed to close before a storm, have given the plant the name of "poor man's weatherglass." The petals are slightly fringed. The garden species, the blue pimpernel, has larger, dark blue flowers. Water pimpernel, as its name implies, grows in wet places and along streams. Pimpernel grows in the Eastern States and flowers all summer.

Pin, a piece of steel or brass wire furnished with a head at one end and a point at the other. Pins are used chiefly to fasten together, temporarily, articles of wearing apparel, and by seamstresses and tailors for holding their work while it is being sewed. Pins of elaborate design, varying in size up to eight inches in length and ornamented by golden heads containing jewels, and, no doubt, designed for holding the hair, were found in many Egyptian tombs. By modern methods the ordinary pin, which originally was made by hand, is now made by machinery attended principally by young women, and the cost of production is slightly above that of the price of the material.

MANUFACTURE. The wire is first coiled on reels from which it is fed into machines, where it is first cut into proper lengths. These lengths drop into a receptacle and arrange themselves in a slot formed by two parallel bars. When the pieces reach the lower end of these bars, they are seized and hammered between two dies to form the head, and as they pass along in the grip of another device, they are rotated and brought to bear against revolving emery stones, by which they are pointed. They are then dropped into a cleaning solution and afterwards into hot melted tin, which plates them. After the plating, the pins go into a revolving barrel filled with bran and sawdust, which cools and polishes them. Pins are put into papers by first dropping them into a metallic plate provided with slots of sufficient size to allow only the body of the pin to go through, while the

heads are held back. They are thus put into rows again and pass along abreast in chutes, where a device by means of a lever forces the proper number into the folds of a paper, forming by consecutive operations a paper of pins. These are folded, wrapped and boxed ready for shipment. Pin-making machinery is of New England manufacture.

Pinchot, *Pin' sho,* **Gifford** (1865-), an American forester, born at Simsbury, Conn. Having graduated from Yale in 1889, he studied forestry in France, Germany, Switzerland and Austria, and began his first systematic forest work in the United States at Biltmore, N. C., in January, 1892. Later, in 1898, he became head of what is now the Forest Service of the United States Department of Agriculture, and this office he filled until 1910. Meanwhile, he inspected the forests of the Philippines and recommended a forest policy for the islands, and in 1903 he became professor of forestry at Yale. Mr. Pinchot has served on such commissions as that on public lands, on department methods, on inland waterways, on country life and on national conservation. He has written *The White Pine* (with H. S. Graves), *The Adirondack Spruce, A Primer of Forestry* and *The Fight for Conservation.*

Pinckney, *Pink' ny,* **Charles** (1758-1824), an American statesman, born at Charleston, S. C. In 1779, when he had reached his majority, he was sent to the Legislature of the province. Six years later he entered the Continental Congress, and in 1787 he was a member of the Constitutional Convention. From 1789 to 1792, 1796 to 1798 and 1806 to 1808 he was governor of South Carolina. Pinckney served in the State Legislature, was minister to Spain, a member of the House of Representatives of the United States from 1819 to 1821, and was a member of the United States Senate.

Pinckney, Charles Cotesworth (1746-1825), an American statesman, born at Charleston, S. C. He was prominent in the Revolutionary War, being aid-de-camp to Washington at Brandywine and at Germantown, and was taken prisoner in 1780 at the surrender of Charleston. He was a member of the Constitutional Convention in 1787. Sent as minister to France in 1796, because of strained relations between that country and the United States, he was not received, and went to Holland. The next year, however, he returned with Elbridge Gerry and John Marshall, who had been appointed to act with him. During negotiations with Talleyrand, Napoleon's minister of foreign affairs, it was intimated to the American commissioners that, by the payment of money, the United States could secure a satisfactory settlement of all difficulties. To this proposal Pinckney is credited with the reply: "War be it, then; millions for defense, sir, but not one cent for tribute!" The correspondence relating to this affair was known as the X Y Z Papers. See X Y Z Papers.

Pinckney, Thomas (1750-1828), an American diplomat, born at Charleston, S. C. He studied in England and was admitted to the English bar. In 1772 he returned to America and took part in the Revolutionary War, being made a prisoner at Camden. He was governor of South Carolina, minister to England and, in 1794, commissioner to Spain. At this time he negotiated the Treaty of San Lorenzo el Real (1795), by which the boundary between the United States and East and West Florida and between the United States and Louisiana was settled; also by this treaty the United States secured free navigation of the Mississippi to its mouth. Pinckney was a candidate for vice-president on the Federalist ticket in 1796. He was a member of Congress in 1797-1801, and later served as major-general in the War of 1812.

Pin'dar (about 522-about 445 B. C.), a Greek lyric poet, born near Thebes, in Bœotia. He received an early musical and poetical training, and his first poems were surcharged with ornament and melodic splendor. Later, this magnificence gave way to a more severe and classic simplicity, and his best proces-

sional and lyric odes are unsurpassed in their sublimity. The only extant works are the four books of his triumphal hymns written to honor the victors at the four great national games—the Pythian, Olympian, Isthmian and Nemean. Pindar made free use of the myth to create fresh interest in conventional occasions, and combined their theme with the celebration in an admirably artless manner. He ably pictured the glories of Hellas and revealed the spiritual unity underlying the common language and religion of his country.

Pine, a large and interesting family of evergreen trees, having representatives throughout the Northern Hemisphere from the Arctic Ocean to the East and the West Indies. There are nearly 100 species, many of which are native in the United States, and almost all of which are extremely valuable. The bark is furrowed or has thin scales and is often reddish-brown in color. The sapwood is white but the heartwood within is darkened by bands of resin. The fragrant leaves are needlelike in form and are held in clusters by groups of dry, sheathing scales; the differences between the leaves furnish a means of recognizing the various species, as they may be long or short and may be in clusters of two, three, four or five "needles." The pistillate flowers produce cones, which differ greatly in form and size and which require two or three seasons' growth to bring them to a state of maturity.

In the United States pines are generally classed as either soft or pitch pines. To the former class belong: the white pine, known by its long, blue-green needles, which are soft to the touch; the Rocky Mountain white pine; the sugar, or Douglas, pine; the fox-tail, the hickory and the nut pines. All of these have soft, easily worked heartwood. The pitch pines include a larger number and are characterized by having heavy, coarse-grained wood. Chief among these are: the pitch pine; the yellow, or Georgia, pine; the scrub pine; the Norway pine; and the southern pine.

The white pine is the most valuable lumber tree known; its wood is white and soft and used for flooring, window sashes, interior finishing and construction work. The Norway pines are probably the most picturesque. Their trunks rise, straight and slender, to a height of 150 to 200 ft., and bear, near their summit, rugged branches, thickly covered with leaves, so dark in color that in contrast with the brilliant Northern sunsets they seem to present a blue-black or purple mass, underneath which the sunlight touches the stems with softest light. The Norway pines are valuable from a commercial point of view, for they make tall straight masts and poles. The Georgia pine is the source of pitch, tar and turpentine and its wood furnishes charcoal, lumber and fuel.

The pine cone and tassel are together the state emblem of Maine. See TAR; TURPENTINE; PITCH; DOUGLAS FIR.

Pineapple, a low, tropical plant of the Pineapple Family. It is practically stemless, for its stiff, sharp-toothed, bladelike leaves rise directly from the root. From the center of this circle of leaves rises a short spike of flowers, which, becoming fleshy and closely packed, forms the fruit familiarly known. Since there is but one spike of blossoms, the fruit also appears singly, but after one has ripened and been cut a second appears, which may be followed by a third and so on. An average plant will bear for about ten years. The fruit is surmounted by a small circle of leaves, called the crown, by means of which the plant may be propagated; seeds are rarely developed and plants grown from seed are slow in maturing. Plants are sometimes propagated from ratoons, second-year growths from the roots.

The pineapple is a delicious fruit and so popular in the United States, that although California, Florida and Hawaii raise great quantities, it is necessary to ship more from the West Indies, the Azores and northern Africa in order to supply the demand. The fruits are gathered and placed on the market fresh or are shipped to canneries, where they are canned in sliced or shredded form.

Pineapples are easily raised but need care and attention or the fruit will be fibrous and dry; they grow best in moist, warm climates, but have been successfully produced in greenhouses in the North.

Pine Bluff, Ark., a city and the county seat of Jefferson Co., 42 m s.e. of Little Rock and 155 m. s.w. of Memphis, on the Arkansas River, 107 m. above where it flows into the Mississippi River, and on the St. Louis, Iron Mountain & Southern, the St. Louis Southwestern, the Pine Bluff & Western and other railroads. There is natural gas for domestic and manufacturing purposes. In and near the city are cotton and cottonseed-oil mills, railroad shops, sawmills, hardwood mills, foundries, brick plants, sheet-iron works, stave works and manufactories of clothing, cigars, excelsior, carbonated beverages, extracts, mattresses, hats, screens, structural marble, umbrellas and other diversified products. The thoroughbred poultry business is largely engaged in. Among the educational institutions are Merrill Institute, a state normal (colored) and a high school. There are also good hotels, a number of banks, churches, three well-equipped hospitals, a courthouse and an opera house. State fairs are held here annually. Pine Bluff was laid out in 1832, and in 1885 was chartered as a city. Population 19,280; including the Cotton Belt shops just outside the city limits, approximately 28,000, in 1920.

Piner'o, Sir Arthur Wing (1855-), an English dramatist, born in London. He abandoned law and began to act in 1874, and after 1881 devoted himself to play writing, dealing with vital social and moral questions. He was knighted in 1909. His greatest play is *The Second Mrs. Tanqueray;* others include *Sweet Lavender, The Profligate, The Benefit of the Doubt, The Gay Lord Quex, The Thunderbolt* and *Mid-Channel.*

Pines, Isle of, one of the West India Islands, 35 m. s. of Cuba, to which it belongs. The island has an area of about 900 sq. m. The coasts are indented by numerous bays and inlets and the surface comprises mountains and plains, the highest peaks being about 1500 ft. above sea level. The island has a number of rivers, and the largest are navigable for four or five miles. The climate is mild and healthful. The chief products are tobacco, lumber, turpentine, sulphur, pitch and tar. Population, about 3200.

Pine-Tree Shilling, a coin issued by Massachusetts Colony. It bore on one side a rudely engraved pine tree encircled by the words *Masathusets In;* on the other side, the words *New England An. Dom.* encircling *1652,* the year in which the coin was struck, also the figure *XII* to indicate that its value was 12 pence, about 18 cents. In the "mint house" at Boston, in this same year, coins representing the value of sixpence and threepence were made. In 1662 a two-penny piece was added to the pine-tree series.

Ping Pong, an adaptation of lawn tennis, introduced from England about 1902. It is played by two persons on a *regulation* table measuring nine by five feet, or on any other not larger than ten by five or smaller than five and one-half by three, laid out like a lawn tennis court for *singles.* The height of the net should be three-quarters of an inch for each foot in the length of the table. Balls of celluloid are used, and bats similar in shape to tennis rackets, but sometimes covered with a thin skin like a battledore, rather than with gut. The ball must be served from behind the table and with a stroke which is strictly underhand. Volleying is not allowed and but one ball is served to a given court. Otherwise the rules are similar to those of lawn tennis.

Pin'gree, Hazen Senter (1840-1901), an American manufacturer and governor, born in Denmark, Me. At first he was a shoe cutter; and then a soldier in the Civil War, suffering imprisonment at Andersonville. In 1865 he and C. H. Smith established the shoe factory which has since become, from a small beginning, one of the largest in the West. Pingree was mayor of Detroit for seven years following 1889, when he became governor of Michigan, serving until

1900. He was an advocate of municipal ownership of certain public utilities, and of better methods of taxation.

Pink, a sweet, old-fashioned plant of the Pink Family growing in old gardens whence it has escaped to fence rows and grassy roadsides, or, in an allied species, growing wild in fields and open groves. It is a fragrant, beautiful plant with branching stems and narrow, grasslike leaves. The flower stems are slender and cylindrical with noticeably enlarged joints at their juncture with the main stem. There are five petals borne in a pale green calyx cup, and, while their general color, as the name implies, is pink, they may be red, white or magenta and striped or dotted with darker colors. These petals are apt to have crinkled or fringed edges, which spread back and give the flowers a soft, delicate appearance. The fragrance of the garden pink is so much like that of the clove that the name clove, or spice, pink is often applied. The carnation is the cultivated descendant of this flower. Wild pink is found in Northern woods blooming early in August.

The sweet William, a woodland plant whose flowers grow in close, flat-topped clusters but whose individual blossoms are the same as those of the wild pink, is often locally called bunch pink.

Pink'erton, Allan (1819-1884), a detective, born in Scotland. In 1842 he made his home in Chicago, where he became deputy sheriff, and later served on the detective force of the Chicago police. His success in this line was so marked that he was encouraged to organize a private detective bureau which has since become widely known for its skillful handling of difficult problems in detective service. During the Civil War Pinkerton was in charge of the secret police service of the army. He wrote *Criminal Reminiscences, The Spy of the Rebellion, Thirty Years a Detective* and *The Molly Maguires and the Detectives.*

Pin"nipe'dia, an order of flesh-eating Mammals that live in the sea. Their name, which means fin-footed, is very well applied to this group, which contains the seals, sea bears and walruses. Unlike the whales, which are also sea Mammals, the Pinnipedia have two pairs of limbs, both of which are more or less adapted for swimming and are called flippers. The teeth are strong and sharp, as is necessary for carnivorous, or flesh-eating, animals. The eyes are prominent and somewhat pathetic, but external ears are lacking in all except the fur seals. Their bodies are fishlike in form and terminated by caudal, or tail, fins, but in spite of this superficial resemblance to fish, the members of the group are much more nearly related to such carnivorous animals as bears. See SEAL; FUR SEAL; ELEPHANT SEAL; SEA LION; WALRUS.

Pinturicchio, *Peen" too reek' kyo,* (1454-1513), an Italian painter of the Umbrian School, born at Perugia. In 1484 he was engaged as assistant to Perugino in fresco work in the Sistine Chapel; the work of these two artists shows great similarity in design and methods of execution. Pinturicchio's paintings are chiefly frescoes, highly decorative in style. They include the *Adoration of the Shepherds* in Santa Maria del Popolo; frescoes in the Cathedral of Orvieto and in the Vatican; the series illustrating the life of San Bernardino, in the Bufalini Chapel, Rome; the *Madonna* in the Perugia Academy; and frescoes in the cathedral library at Siena. The last-named commission called for the aid of several assistants, among whom was Raphael. These frescoes depict the life of Pope Pius II.

Pipal, *Pe' pal.* See PEEPUL.

Pipe, generally a cylindrical tube for conveying water, steam, gas and other fluids. The materials composing pipes are of great variety and include wood, stone, earthenware, iron, steel, copper, brass, aluminum, lead, leather, rubber and gutta-percha. Drainage tiles are pipes ranging from 1 to 24 inches in diameter and made of clay burned to hardness. Sewer pipes in their larger sizes are made either of concrete or brick. Steam pipes are now made principally of steel, and are provided with fittings, such as elbows, unions, crosses and tees, and with screw threads or with flanges to make all

needed connections. Gas pipes of large diameter to carry low pressures are made of cast iron. Lead pipe is generally used by plumbers to make connections with water supply in wash basins.

Pipe, an implement for smoking tobacco. It consists of a bowl in which the tobacco is burned, connected with a stem or mouthpiece, through which the smoke is drawn. Pipes are made of many different shapes and a large variety of materials are employed. Those with clay bowls and reed stems were commonly used by the American colonists; afterwards the corncob bowl superseded it in favor. The most expensive pipes are those made of carved meerschaum and with amber stems and mouthpieces. Bowls of brier root, with stems and mouthpieces either of amber or its imitation, celluloid, horn or gutta-percha, form most of the pipes used by smokers in England and in the United States. Many Germans prefer the porcelain bowls, with long stems made of cherry grown near Vienna. The pipe known as the Eastern hookah is very generally used by wealthy Turks. It is usually furnished with a bowl for holding the tobacco, which sets upon and is connected with a tube within a glass vessel partially filled with water, and a flexible tube is inserted in the vessel in such a way that the smoke is drawn through the water and cooled before reaching the mouth. Pipes made by the American Indians, usually of stone and gayly decorated, have been found in many ancient tombs or mounds in the western part of the United States. See MEERSCHAUM.

Pipefish. See SEA HORSE.

Pipestone, a soft clay rock of very fine texture and used by the Indians exclusively for making pipes; hence its name. The calumet, or sacred peace pipe, was made from this rock, and before the Indians of the Mississippi Valley were disturbed by whites, the pipestone quarry near the present village of Pipestone, Minn., was visited by tribes that came a long distance to obtain the stone. The quarry was neutral ground and accessible to all tribes. The best variety of the stone is of a dark red; other varieties are pinkish, and some are mottled. The rock is found only in small quantities, and in the Minnesota quarry lies about four feet beneath the surface and at the foot of a large cliff of red jasper. There is another quarry near Sioux Falls, S. D., and these are the only deposits ever discovered. The region in Minnesota has been made an Indian reservation and is now visited by representatives of the various tribes once a year, when the quarry is opened and the necessary quantity of rock procured. The opening is then filled with earth to prevent depredations. Longfellow in *Hiawatha* has given a beautiful and accurate description of this quarry and its surroundings.

Pip'it. See WAGTAIL FAMILY, subhead *Pipit.*

Pip'pin, or Pep'in, the name of several Frankish officers who were called mayors of the palace. They had the real authority during the reigns of the weak Merovingian kings. The first of the name to attain prominence was Pippin the Elder (d. 639). His grandson, Pippin of Heristal (d. 714), became ruler over all the Franks. His son, the famous Charles Martel, defeated the Saracens of Spain in the famous Battle of Tours (732), saving the Christian civilization of western Europe from Mohammedan supremacy. In 741, shortly before his death, Charles Martel divided the Frankish Kingdom between his two sons, Carloman and Pippin the Short, and the brothers became mayors of the palace. From 742 to 751 a weak king of the Merovingian family occupied the throne, but with no real authority. After the abdication of Carloman, in 747, Pippin ruled alone, and in 751 he was crowned king, the first of the Carolingian dynasty.

In 754 Pippin aided Pope Stephen II, who was harassed by the Lombards, and in 756 made a donation of the regained lands to the Pope, thus practically laying the foundation of the temporal sovereignty of the popes. Pippin was succeeded in 768 by his sons Carloman and Charles, the latter of whom is known in history as Charlemagne, or Charles the

Great. See CHARLEMAGNE; CHARLES MARTEL; CAROLINGIANS.

Piqua, *Pik' wa,* **Ohio,** a city of Miami Co., 28 m. n.w. of Dayton and 70 m. n.w. of Columbus, on the Miami River, the Miami & Erie Canal and at the junction of the Cincinnati, Hamilton & Dayton and the Pittsburgh, Cincinnati, Chicago & St. Louis railroads. The city is situated on a plateau which is separated by the river from higher ground on the opposite bank. Excellent water power is afforded by the Miami, which makes the city an important industrial center with large linseed-oil works, rolling mills, ironworks, sheet-steel mills, furniture factories, handle, pole and shaft works, corrugated-iron works, tin-plate mills, woolen and underwear mills, carriage factories and strawboard works. The Schmidlapp Free Library and the Ball Memorial Hospital are located here. Population in 1920, 15,044.

Piquet, *Pe ket',* a card game for two persons, more common in England than in the United States, and there often called picket. Thirty-two cards are used, all the plain cards below 7 being thrown out. After shuffling, the one drawing the lowest card deals, giving two to each until but eight remain in the stack. If either holds 12 plain cards, he scores for a *carte blanche,* that is, ten points, after showing his hand. The nondealer, or first hand, must then discard one, and may discard up to five, choosing from the first five in the pack. The dealer must discard one, but may discard two or three. The game is won by the player who first reaches 100. The game is complicated and involves many technicalities.

Piracy, *Pi' ra sy,* robbery on the high seas or where maritime law has jurisdiction. Piracy is robbery directed against all civilized states and is committed by the officers and crew of a vessel which has no commission. Piracy committed on the high seas is punishable by international law, but pirates may also be punished by the state to which the ship capturing them belongs. The punishment is usually death. Piracy has now been practically driven from the seas.

Piræus, *Pi re' us,* the principal port of Athens, situated on a rocky peninsula about 5 m. s.w. of that city. Of the three harbors the largest is on the west side and is supplied with modern docks. One-half the commerce, and more, of modern Greece passes through Piræus. The manufactures consist of textiles, leather, paper, brandy and macaroni. After the Persian Wars the peninsula was enclosed by strong walls, known as the Long Walls, that connected Piræus with Athens. During the Middle Ages it suffered with the decline and ruin of Athens, but with the restoration of Athens as capital of Greece, the prosperity of Piræus has been restored. Population, approximately 43,000.

Pisa, *Pe' sah,* **Leaning Tower of,** a famous campanile, or bell tower, of Pisa. It is round in structure, 179 ft. high, 13 ft. thick at the base, about half as thick at the top and over 16 ft. out of the perpendicular. Begun in the 12th century, it was completed in 1350, and is now considered one of the noblest types of Southern Romanesque architecture. There is nothing to indicate that the architects, Bonanno and William of Innsbruck, intentionally produced the slant, but rather that the tower assumed its oblique position while it was still in the building.

Pisces, *Pis' eez,* **The Fishes,** the 12th sign of the zodiac; also a constellation containing a number of interesting double stars, which can be seen only through a telescope. The sun enters Pisces about the 20th of February. The symbol is ♓.

Pisis'tratus (?-527 B. C.), first tyrant of Athens. He was of noble birth and a relative of Solon. Having allied himself with the popular party, by his generosity to the people he gained their good will. We are told that he appeared in the market place one day, bleeding from self-inflicted wounds which he said he had suffered from his enemies, the aristocrats, and the indignant people gave him a bodyguard. A little later he seized the Acropolis and made himself tyrant, or master of the city. He kept the wise laws of Solon, and though twice driven

from Athens, he died tyrant of the city, leaving the power to his sons. Splendid buildings arose during his rule, a public library was established, the poems of Homer were collected, and by his liberal commercial policy wealth began to pour into the city. His rule was a step beyond the rule of the aristocrats toward democracy.

Pitcairn, *Pit' karn,* **John** (about 1740-1775), a British soldier, born in Fifeshire, Scotland. He entered the army, becoming captain in 1765 and major in 1771. He was stationed in Boston for seven years and commanded the British expedition against Lexington and Concord, Apr. 19, 1775. He was mortally wounded in the last assault on Bunker Hill.

Pitch, a dark-colored, resinous product obtained by the destructive distillation of wood, coal tar, etc. In appearance it is solid and lustrous. Its chief use is in shipbuilding, where it is employed to close the seams of boats; iron and wood coated with pitch are preserved from decay and rust. Natural asphalt, found in the region of the Mediterranean Sea, is called mineral pitch. See Asphalt; Tar.

Pitch'er, Moll, wife of an American Revolutionary soldier, who distinguished herself at the Battle of Monmouth (1778) by her fearlessness. The story is that her husband was killed in the act of firing a cannon, whereupon she took his place, vowing revenge for his death. She was commended by Washington and commissioned sergeant. These statements are of doubtful authority.

Pitcher Plant, a curious plant of the Pitcher Plant Family, named from the peculiar shape of the leaves. The plant grows in low marshy places or near streams. Its leaves are streaked brownish-green and red, are vaselike in form and have a protruding lip. They catch and hold the rain, forming reservoirs against a time of drought. The inside of the tube is lined with coarse and bristly hairs, which entangle the insects that seek the water and honey lower in the cup; here the insects are held until they die of starvation or drowning, and are then slowly absorbed by the plant, which because of its need of insect food, is known as a carnivorous plant. In some species the leaves have long wings upon either side of the cup. The flower stems, which spring directly from the roots, have a single purple, or, rarely, yellow flower. The pitcher plant is found from Canada to Florida and one species is known in California and South America. It is locally known as trumpet leaf, sidesaddle flower and Indian teakettle.

Pit'man, Sir Isaac (1813-1897), inventor of the Pitman system of shorthand, was born at Trowbridge, Wiltshire, England. He was educated in London and taught for several years; but, after the publication of his *Stenographic Sound-hand* in 1837, he gave his attention wholly to the promotion of shorthand study. The commercial needs of the time demanded a modernizing of business methods, and with these some system of shorthand. Pitman's system successfully met the demand, and, during his lifetime, it was introduced into every English-speaking country. For more than 50 years he edited a phonographic journal, established by him in 1842. He was knighted in 1894 for his eminent service in the promotion of shorthand writing.

Pit'ney, Mahlon (1858-), an American jurist, born at Morristown, N. J., and educated at Princeton University. He was admitted to the bar in 1882 and practiced law in his native city. In 1895 he entered Congress as a representative, was elected to serve a second term and in 1899 became a member of the New Jersey State Senate. In 1901 he became associate justice of the Supreme Court of New Jersey, and chancellor of New Jersey in 1908. This office Judge Pitney resigned in 1912 to become associate justice of the Supreme Court of the United States, as successor to Justice Harlan.

Pitt, William, First Earl of Chatham (1708-1778), an eminent English statesman, often called the Elder Pitt, born in Westminster. He was educated

at Eton and Oxford, but ill health prevented his taking a degree. He entered the army in his young manhood, and in 1735 was a member of Parliament. He was dismissed from the army soon after entering Parliament, having incurred the opposition of both George II and Robert Walpole, but he soon became very powerful on account of his ability as an orator, and served successively as joint vice-treasurer of Ireland, paymaster-general of the forces and privy councilor. Pitt's opposition to the foreign policy of the government in 1755 brought about his dismissal from office, but the following year the King was obliged to call him to the head of affairs on account of the disasters the English arms were suffering in America, where the French and Indian War, the American phase of the Seven Years' War, had begun. Pitt's vigorous and wise war policy brought about the triumph of England over France in India, Africa, Canada, on the Rhine and on the seas, and the people proudly called him the "Great Commoner."

After the accession of George III, Pitt was compelled to resign, but, though he remained out of office from 1761 to 1766, he occasionally employed his eloquence to defeat bad measures of the government, and opposed with vigor the oppressive acts against the colonists. In 1766 he was created Viscount Pitt and Earl of Chatham, and became nominal head of the ministry succeeding the Rockingham cabinet; ill health prevented his taking an active part in the government, and in 1768 he resigned, never to resume office. He put forth every effort, however, to procure a peaceable settlement with the American colonies. Nevertheless, when the Treaty of Alliance between France and America was entered into, and it was proposed to make peace on any terms, he appeared before the House of Lords and eloquently pleaded for the rejection of any such humiliating proposal. Exhausted by his heroic effort, the aged statesman fell fainting into the arms of his friends, and died a few days later.

Pitt was uniformly upright in character and in all of his acts was moved by sincere and intense love of country.

Pitt, William (1759-1806), a famous English statesman, son of the first Earl of Chatham, born at Hayes. He received his M. A. at Cambridge, studied law, was admitted to the bar and in 1781 took his seat in Parliament, immediately joining the party that followed his father, and opposing Lord North. He also advocated a reform in the representation to Parliament. In 1782 Pitt became chancellor of the exchequer under Shelburne, and the following year prime minister. He soon became the most powerful subject that England had had for years, and was instrumental in reforming financial matters and in the establishment of a new constitution for the East India Company. The outbreak of the French Revolution, however, put an end to his favorite plan for Parliamentary reform. He showed persistent enmity toward Napoleon throughout the Napoleonic wars, inaugurating the system of furnishing subsidies to the Continental allies.

In 1801 Pitt resigned because George III refused to accept his measures for relieving the Catholics of their political disqualifications, but he loyally supported the government in its efforts to secure peace with France. In 1803, when England declared war against France, Pitt again became active, resumed the premiership in 1804 and by his vigorous measures formed the third great coalition to oppose Napoleon. He did not live, however, to see the defeat of that conqueror. Disheartened by the defeat of the allies at Austerlitz, he died in 1806 without knowing that his work would ultimately bring about Napoleon's downfall. He ranks among the greatest of England's prime ministers.

Pitts'burg, Kans., a city of Crawford Co., 130 m. s. of Kansas City, on the Missouri Pacific, the Atchison, Topeka & Santa Fe, the St. Louis & San Francisco, the Kansas City Southern and other railroads; and it has interurban electric-railway service. The city is surrounded by a region rich in deposits of bituminous

coal, lead and zinc, and there are natural gas and oil fields in the vicinity. Underlying the city is a vast bed of shale, utilized in the manufacture of tile, vitrified brick and sewer pipe. There are car shops here, foundries and machine shops, brick and sewer-pipe plants, flour mills, packing houses, grain elevators, a glass factory, planing and rolling mills, an ice plant and large zinc smelters. The coal-mining interests are extensive. A large trade in coal, farm products and manufactured articles is carried on. Pittsburg is the seat of the State Normal Training School, opened in 1903, and of the Pittsburg Business College. It has a public library and a hospital. Settled about 1876, the place was incorporated in 1880. Population in 1920, U. S. Census, 18,052.

Pittsburgh, Pa., a port of entry, county seat of Allegheny Co., and second largest city of the state, 360 m. n.w. of Philadelphia, 368 m. n.w. of Washington and 440 m. s.w. of New York City, on the Monongahela, the Allegheny and the Ohio rivers and on the Pittsburgh, Cincinnati, Chicago & St. Louis, the Pennsylvania, the Pittsburgh & Lake Erie, the Baltimore & Ohio, the Pittsburgh, Chartiers & Youghiogheny, the Buffalo, Rochester & Pittsburgh, the Wabash-Pittsburgh Terminal and other railroads. Transportation is also greatly facilitated by the various lines of river boats, as the Ohio River gives access to the waters of the Gulf of Mexico and to thousands of miles of navigable waterways. Pittsburgh has an area of 40.67 sq. m., including Allegheny, which was annexed in 1906. A score or more of bridges span the rivers, and electric interurban service reaches out to the many towns and cities of the thickly populated valley. Factories extend for miles along the banks of all the rivers and are the cause of Pittsburgh's nickname, the "Smoky City." Coal is the rock upon which Pittsburgh is built. The region is also rich in petroleum and natural gas. The railways have a heavy tonnage of coal, coke and iron, and the city ranks first in the United States in the manufacture of iron and steel products.

Parks and Boulevards. The principal residential sections are located in the "East End," in proximity to the parks or on the hills overlooking the Allegheny River from the north. Schenley Park of 422 acres lies along the Monongahela River, and Highland Park overlooks the Allegheny River. Riverview and West parks are in the Allegheny district. Among the handsome streets are Fifth, Penn, Morewood, North Highland, Shady and Amberson avenues and Thomas Boulevard. The financial heart of the city is on Fourth Avenue and Wood Street. The wholesale, retail, office buildings, banks, hotels and railroad terminals are crowded into "The Point," formed by the junction of the Monongahela and Allegheny rivers, with Fourth, Fifth and Liberty avenues as the principal thoroughfares. Penn Avenue is the center of the wholesale district.

Public Buildings. The city contains many fine public buildings, among the number being the Federal Building, containing the post office and the customs offices; the Allegheny County Courthouse, Union Station, city hall, market house, the Jones & Laughlin, the Commonwealth Trust, the Union Bank, the Farmers' Bank, the Frick and Duquesne buildings; many fine hotels, including the Lincoln, the Henry and Hotel Schenley, which is one of the handsomest in the country; the Nixon Theater, notable in its architecture; and imposing business blocks. There are about 400 churches, the most prominent ecclesiastical structures being St. Paul's Cathedral (Catholic), Church of the Ascension (Episcopal), United Presbyterian, Emory Methodist, Calvary Protestant (Episcopal) and the Rodeph Shalom Synagogue. The city is the seat of a Catholic see and of an Episcopal bishopric.

Institutions. The leading educational institutions include the Carnegie Institute and technical schools, located in Schenley Park, embracing an area of 32 acres. In the great entrance hall of the main building is a series of mural decorations by John White Alexander, a native of Pittsburgh. The institute was established by

a gift of $10,000,000 from Andrew Carnegie in 1895. The Phipps Conservatory, the largest in America, was presented to the city by Henry Phipps in 1893. Other institutions include the University of Pittsburgh, three seminaries, about 14 private schools, five high schools and 120 public schools. Among the benevolent and charitable institutions are the Reineman Hospital, the oldest in the city, 21 additional hospitals, 60 asylums and infirmaries and 26 other organizations for the relief of the poor and distressed. The Children's Aid Society of Western Pennsylvania, the Pittsburgh Association for the Improvement of the Poor and the Western Pennsylvania Humane Society are located here.

INDUSTRY AND COMMERCE. Pittsburgh is the center of one of the world's greatest coal-producing areas, and the railroads have a heavy tonnage of coal, coke and iron; a large part of the iron ore produced in the region of Lake Superior is brought to Pittsburgh. In the city and immediate vicinity are the gigantic plants of the United States Steel Corporation and the Westinghouse Company for the manufacture of electrical and air-brake apparatus. The main pickle plant of the Heinz Company, the largest in the country, is located in the Allegheny district of the city. The Pittsburgh glass district occupies a foremost position as a glass manufacturing and distributing city. There are also large manufactories of tin plate, fire brick, white lead, cork, art goods, cigars, automobiles, tents and awnings, mattresses, carpets, confectionery, furniture, hardware, wall paper, pianos and other products. There are also large stockyards and packing plants. Population, 1920, U. S. census, 588,193.

HISTORY. The French originally claimed the valleys of the Ohio and Mississippi rivers by virtue of La Salle's explorations in 1669. In the spring of 1754 a force of Virginians was dispatched by Governor Dinwiddie of Virginia to build a fort on the present site of Pittsburgh, which was first named Ft. Duquesne and afterward named Ft. Pitt in honor of William Pitt. The first encounter between the French and the Virginians, under Washington, took place on May 27, 1754, when a body of French troops was captured. The opening of the Northwest Territory gave an impetus to trade, and a city charter was granted in 1816. The original limits of the city have been greatly enlarged by the bill for a "Greater Pittsburgh." The population of the city in 1920, U. S. Census, 588,343.

Pittsburg Landing, Battle of. See SHILOH, BATTLE OF.

Pitts'field, Mass., a city and county seat of Berkshire Co., 150 m. w. of Boston, on the Housatonic River and on the New York, New Haven & Hartford, the Boston & Albany and the New York Central & Hudson River railroads. It is the center of an extensive street-railway system, which reaches out to Bennington, Vt., and Hoosick Falls, N. Y., on the north; to Lenox, Lee, Stockbridge, Great Barrington, Mass., and Canaan, Conn., on the south; and to Hinsdale, Dalton and West Pittsfield on the east and west. It is situated in the Berkshire Valley on a site of great natural beauty and contains many handsome residences. Several villages are included within the corporate limits of the city, and six small lakes constitute one of Pittsfield's greatest attractions, the finest being Onota and Pontoosuc. Greylock, the highest point in the Berkshires, has an elevation of 3500 ft. above sea level and is easily reached from Pittsfield. In the southwestern part of the city is Shaker Village, settled about 1790 by Shakers. Among the noteworthy structures are the courthouse, built of white marble, the city hall, First Congregational Church, the oldest in Pittsfield, St. Stephen's Church (Episcopal) and St. Joseph's Cathedral. In the park in the center of the city is the original statue of the *Massachusetts Color Bearer* by Launt Thompson. This statue has been reproduced on the battlefield of Gettysburg, Pa.

Among the institutions and public buildings are the Art Museum, the gift of Zenas Crane, which contains a valuable and extensive collection of curios;

and the Berkshire Athenæum, the gift of Hon. Thomas Allen, containing the public library and the rooms of the Berkshire Historical Society. The public institutions include the House of Mercy Hospital, Bishop Training School for nurses and home for aged women. The central home of the Agassiz Association and Miss Hall's School for girls are located here. Williams College is 30 m. distant.

Pittsfield has extensive manufactories of cotton and woolen goods, paper, paper machinery, boots and shoes, hats, caps, trousers, electrical appliances, spool silk and silk braid, knit goods and electric piano players. The first settlement was made in 1743, but families were not brought to the frontier until 1752. It was first called Pontoosuck, but the name was changed to Pittsfield when it was incorporated as a township in 1761 in honor of William Pitt, Earl of Chatham. It was here in 1845 in the house known as Elm Knoll that Longfellow wrote the poem of *The Old Clock on the Stairs.* Pittsfield was chartered as a city in 1891. Population in 1920, 41,763.

Pitts'ton, Pa., a city of Luzerne Co., 9 m. n.e. of Wilkes-Barre, and about 9 m. s.w. of Scranton, on the Susquehanna River at the mouth of the Lackawanna, and on the Lehigh Valley, the Delaware, Lackawanna & Western and the Central of New Jersey railroads. On the opposite side of the river is West Pittston, which is mainly a residential town. Pittston is an industrial center of considerable importance. It is connected by belt-line electric railroads with all the important towns and cities throughout the Wyoming Valley. The town was named in honor of William Pitt and for some years was called Pittston Ferry. It is situated in the great Wyoming anthracite region and its chief industries are connected with the mining and shipping of coal. There are also large deposits of fire clay in the vicinity. The principal manufacturing establishments include lumber and flour mills, foundries, machine shops, terra-cotta and brick works, stove and engine works, an underwear factory, tool and dye works and paper and silk mills. St. John's Academy is located here. The town was settled in 1770, incorporated as a borough in 1803 and chartered as a city in 1894. Population in 1920, 18,497.

Pi'us, the name of ten popes, of whom the following are the most important.

Pius II (1405-1464) was pope from 1458 to 1464. His name was Æneas Sylvius Piccolomini. He was known as one of the most eminent scholars of his age, and previous to his election as pope he held many important public positions. Pius II tried to arouse the Christian nations to unite in a war against the Turks, but was not wholly successful. His letters are among his most interesting literary works.

Pius IV was pope from 1559 to 1565. His most significant act was the reassembling of the Council of Trent on issuing a bull confirming its decrees. The enforcement of these decrees constituted the chief task of his successor, Pius V.

Pius VI was pope from 1775 to 1799. He is especially remembered for the establishment of the museum of the Vatican, begun at his suggestion, and for an attempt to drain the Pontine marshes. He was in continuous conflict with Napoleon, by whom he was removed from Rome and held a prisoner until his death.

Pius VII was elected pope in 1800. When Napoleon became emperor, Pius attended the coronation, but later he incurred the enmity of Napoleon by refusing to attend his coronation at Milan, and by his attempt to secure a change in the Emperor's attitude towards papal authority in Italy. Rome was occupied by French troops, and the Pope was forcibly removed from Rome and held in captivity until 1814, when he was returned to his capital. After the Battle of Waterloo he was unmolested and devoted his later years to the internal administration of affairs, in which he showed great wisdom.

Pius IX ascended the papal throne in 1846. His great ambition was to free Italy from the political condition under

which she was suffering and establish an independent government under a constitution. In this, however, he was only partially successful, owing to the radical views held by some of the leading patriots and the opposition of the French. He convened the Vatican Council in 1869. See Pius X.

Pius X (1835-1914), Giuseppe Sarto, the successor of Pope Leo XIII. He was born at Riese, Italy, of peasant parentage, and was educated at Treviso and at Padua. Ordained a priest Sept. 18, 1858, he first served in small parishes in Venetia. Rising rapidly because of his ability and piety, he was, in 1875, appointed canon of Treviso Cathedral and chancellor of the diocese, as well as spiritual director of the seminary. In quick order he was then made dean of the chapter and vicar-general. On his next promotion he became Bishop of Mantua, and was appointed Patriarch of Venice by Leo XIII in 1893 and, soon after, cardinal. After nearly a week's conclave of the College of Cardinals he was elected pope on Aug. 4, 1903, and five days later was crowned in St. Peter's.

Pius X, a man of genuine piety and simplicity, was so overcome by his election to the Papacy that only a sense of duty persuaded him to accept the great office. Previous to his election he was widely known for his work among the poor, especially in organizing societies and establishing schools in their interest. His characteristic zeal was especially noticeable in his preaching. One of his innovations was to deliver a simple talk to his people each Sunday afternoon. Though careless of ceremony, he was a rigid disciplinarian and unbending in all that pertains to the position of the Church. Pius X spoke polished Italian, had a slight acquaintance with French and German, and was a gifted musician and an able art critic.

Pizarro, *Pi zar' o,* **Francisco** (about 1471-1541), a Spanish adventurer, the conqueror of Peru. He was born in Estremadura, appears to have been neglected by his parents, who taught him neither to read nor to write, and in youth was a swineherd. Later he tried his fortune in America, where he engaged in various military and trading expeditions. While living near Panama, he formed a copartnership with Hernando de Luque, an ecclesiastic, and Diego de Almagro, an adventurer. With their amassed funds, in 1524 they fitted out a small expedition of exploration and conquest, which Pizarro commanded. On their second voyage they discovered Peru; but Pizarro was unable to find in Panama enough volunteers to conquer the new country, so in 1528 he returned to Seville for aid. This was granted him by Charles V, and he recrossed the Atlantic in 1530, arriving in Peru during the civil war of the following year. There he seized the reigning Inca, from whom he first extorted a ransom and then put to death. Soon the whole empire was conquered, though its settlement was long deferred, owing to a feud between Pizarro and Almagro. Pizarro was murdered by a son of Almagro in his palace at Lima, which town, with the cathedral where his body is interred, he had founded. See Atahualpa; Inca; Peru, subhead *History.*

Plague, *Plage,* a contagious disease, due to the presence of a specific bacillus which causes enlargement of the lymphatic glands and suppuration, or generation of pus. The germ is caused by flies and other insects and by rats. A minor form of the disease is marked by slight fever, slight swelling in the glands, local tenderness and trivial systemic disturbance. There are five types of ordinary severe plagues, of which the bubonic variety is the most common. In this variety the period of inoculation lasts from three to seven days. The first symptoms are chills, fever, weakness, headache, vertigo, lassitude and vomiting. Then follow restlessness, constipation, a rise of temperature and tremulousness of speech; the tongue becomes dry and covered with yellow fur and red along the margin; the glands of the neck and groins are enlarged and the face grows pallid. The fever is intermittent, drops for about two days, then rises to 103 or

105 degrees, remaining at this point seven days. At the end of the tenth day the temperature falls, leaving the patient in a state of extreme emaciation and exhaustion and in great danger of heart failure. At this stage hemorrhage, peritonitis or jaundice may seize the patient. When the lungs are involved, the condition often gives rise to pneumonic plague. Plague is not necessarily fatal, but it is so in most cases.

The plague has appeared in various countries from earliest times, causing the loss of hundreds of thousands of lives. It has appeared twice in the United States, in New York City in 1899 and in San Francisco the year following, but it was soon stamped out. Improved sanitary conditions have greatly diminished the number and virulency of plague epidemics, and the number of fatalities has been reduced about 15 per cent by the use of specific serums.

Plain, *Plane,* a broad expanse of level or gently undulating land. The term is usually applied to country not more than 1000 ft. above the sea level, in contrast with *plateau,* which indicates a greater altitude, although the Great Plains of the United States, upon which rise the Rocky Mountains, have an elevation in places of 2000 ft. or more. Plains may be classified with respect to their origin as marine, lacustrine, fluviatile, and plains of denudation.

Marine plains are formed by the sediment transported by rivers. This deposition is widely distributed along the coast by action of the waves, and in time a broad belt of land is built up. The Coastal Plain along the seaboard of the Atlantic and the Gulf of Mexico has been formed in this manner.

Lacustrine plains occupy the basins of dried-up lakes. Notable examples of this formation are the lacustrine plains of Nevada and Utah and the famous Vale of Cashmere in India.

Fluviatile plains are built up by the deposition of silt brought down by rivers and deposited along their course. These are sometimes called flood plains. See DELTA

Plains of denudation result from erosion. They occur in land which has been built up to a considerable elevation above the sea and has become dissected by streams flowing through them, by the wind and by the weather.

Nearly all river plains are of great fertility and produce abundant crops. They are, however, in danger of inundations. The great plains watered by the Mississippi and its tributaries, by the Ganges and the Nile are among the most productive regions in the world. Flooding of the plains of rivers is sometimes periodical and affected by the seasons, while other streams are liable to overflow at any time. In the rainy season the Ganges overflows an area at Bengal 100 m. in breadth; the Nile plain is flooded for several months annually. See PLATEAU.

Plainfield, N. J., a city of Union Co., 24 m. s.w. of New York City and 12 m. s.w. of Elizabeth, on the Central Railroad of New Jersey. Plainfield is an attractive town and a residential suburb of the large cities. It is situated at the base of First Mountain, a continuation of the Orange Mountains. The Muhlenberg Hospital is located here. The chief manufactures include chamois, kid gloves, furniture, printing presses, silk and woolen goods, silver-plated ware, aluminum, machine tools, etc. Plainfield was settled in 1684 but not chartered as a city until 1869. Population in 1920, U. S. Census, 27,700.

Plain of Jezreel, *Jez' re el.* See ESDRAELON.

Pla'ner. See PLANING MACHINE.

Plan'et (wanderer), the general name given to the eight celestial bodies of the solar system which revolve about the sun. A planet differs from a star in that it is not self-luminous. Planets, however, reflect the light from the sun so strongly as not to be easily distinguished by the naked eye from stars. The planets, in the order of their orbits outward from the sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune, each of which is described under its respective title. See SOLAR SYSTEM.

Plan'etoid, the name given the minor planets whose orbits are in the space between the orbits of Mars and Jupiter. The first of these bodies was discovered in January, 1801, and named Ceres. Within the next seven years three others, Pallas, Juno and Vesta, were added to the system, and from year to year others have been added, until about 700 have been discovered. Compared with other heavenly bodies, these planets are very small. Ceres, the largest that has been measured, has a diameter of 485 m. Their distance from the earth is so great that they can be seen only through telescopes of high power.

Plane Tree, or **Sycamore,** *Sik' a more,* also called buttonwood and buttonball, the largest of the forest trees and a member of the Plane Tree Family. There are seven or eight species well known throughout the United States east of the Rockies, and in Africa. The thick trunk divides not far from the ground into large branches, which are covered by a noticeable white bark. The leaves vary in the different species, but in general are broad and rather sharply lobed. Both the flowers and fruit are in globular heads from one to two inches in diameter. The tree is a handsome one and is used as a street tree in Europe and in many cities of the United States. The wood of the plane tree is strong and is used in maxing boxes, crates and butchers' blocks.

Pla'ning Machine, a machine for smoothing or shaping the surface of wood or metal. For working wood it has a revolving head carrying knives or bits, toward which planks are fed by means of rollers, and it is then called a surfacer. It may have heads on two sides and be a double surfacer. When grooves or other shapes are given to the planks, it is called a molding machine. For planing cast iron, steel and brass, the machine is known as a planer. Then the material is held to a bed which travels back and forth in grooves, and at each forward movement a chisel, held in a tool post in an arch above the bed, removes a narrow strip.

Plank'ton, a general term applied to floating organisms on salt and fresh water. The organisms include both plants and animals. Vegetable plankton of the ocean are of greater interest than those in fresh water. They consist of algae, bacteria and diatoms. Plankton sometimes give color to large bodies of water,

PLANTAIN

as the Red Sea, which owes its color to red alga. Zoological plankton include those low forms of animal life which drift with ocean currents. They consist largely of larvæ and diatoms. The phosphorescence of tropical seas is often due to the presence of countless millions of these minute structures.

Plan'tain, a tough, fibrous weed of the Plaintain Family, common all over the United States. American plantain presents in the spring a rosette of broad, deeply-veined leaves, which spring from fine, fibrous roots. Later a slender, ribbed stalk appears which bears, all through the summer, many densely-packed, inconspicuous, white flowers. If examined closely these flowers are seen to have four tiny green sepals, a tubular, four-lobed corolla and two or four short stamens. The round seeds that follow are sought by the birds which aid in scattering them and spreading the growth of the weed. Because of its rapid growth, its flat leaves which kill the grass and its small claim to beauty, it is considered an unwelcome resident on lawns and in fence corners.

The plantain of the East Indies is a large tree of the Banana Family, cultivated for its fruit and for its fiber, from which a strong rope is made.

Plant Louse. See APHID, *A' fid.*

Plas'ter of Paris, a name given to dry, burned gypsum as prepared for use in the arts. It receives its name from the fact that originally it came from beds of gypsum near Paris. As prepared, it is gypsum heated to an extent sufficient to drive off all the moisture, and then ground fine. When water is applied to it, plaster of Paris rapidly assumes a solid form. This property renders it valuable to the modeler and designer for making casts, etc. Dentists use this material in taking a cast of the jaws; architects use it in ornamenting cornices, ceilings, etc.; and sculptors use it in making models from which the marble statue is to be copied. Preparations of plaster of Paris, alum, coloring matter and glue are extensively used for decorating interior walls of dwellings and other buildings. They provide an inexpensive, durable and attractive finishing material. See GYPSUM.

Plata, *Plah' tah,* Rio de la, a river of South America, or the estuary of the Paraná and the Uruguay rivers. It is 143 m. wide at its mouth where it flows into the Atlantic Ocean. The distance between its mouth and the delta of the Paraná is 200 m. The amount of water for which it forms the outlet is enormous, amounting to over 2,000,000 cu. ft. per second at high flood. Navigation is endangered by the swift current, by frequent violent storms and by the shoals formed from the large amounts of sediment constantly carried by the strong current. There are good harbors at Montevideo, Buenos Aires and La Plata. The estuary was named La Plata, or "Silver River" by Sebastian Cabot. It was discovered by Diaz de Solis in 1516.

Plateau, *Plat to',* an elevated area of level or slightly undulating land. In contrast with a plain it is of greater elevation. Plateaus are an almost invariable accompaniment of mountains, having been uplifted by the same earth movement. Great gorges are often formed across plateaus by streams, which, because of the elevation, flow swiftly and cut deep channels. Such a formation is the Grand Canyon of the Colorado. Extensive flat-topped areas lying between streams are known in western North America as mesas, while similar, smaller tracts are called buttes. Some plateaus are so sculptured by erosion and are of such height as to have the appearance of mountains, such as the Catskills. When such plateaus are continuations of mountains, it is often difficult to determine where the one ends and where the other begins. In many arid regions the bare plateaus are faced by steep slopes which have given rise to the name table-lands.

Plateaus are usually cool because of their altitude, but they are often arid when located near mountains, because the latter act as a barrier to the rain-bearing winds of the region. Frequently, however, plateaus exhibit a wide range of temperature. The climate of the Mexican plateau varies from tropical heat to a cool climate like that of the temperate zones. With the differences in temperature there is a lowering of evaporation and increased rainfall, so that the tops of lofty plateaus are often densely wooded. Plateaus are not in-

frequently deserts, such as the vast arid plains of Arabia and Africa, which are constantly fanned by the dry trade winds throughout the year. The only parts of these plateaus in which vegetation is found are at the mouths of streams which flow across them for a short distance and then lose themselves in the sands. See PLAIN.

Pla'ting. See ELECTROPLATING; GILDING.

Plat'inum, one of the precious metals. It was first made known to Europe in 1736. It is generally found in small, irregular grains mixed with other metals, chiefly iron. Sometimes it occurs in masses the size of a pigeon's egg, and in rare cases it has been found in pieces weighing ten pounds. The chief supply comes from the Ural Mountains, although it is also found in Brazil, Colombia, California, Canada and Borneo. Platinum, when pure, is white like silver and is the heaviest metal known except iridium and osmium, and it is highly malleable and ductile. Heat expands it less than it does any other metal, and about the same extent as it does glass; for this reason it is easy to fuse a platinum wire into a glass globe, as in the manufacture of incandescent-light bulbs.

Pure acids do not attack platinum, and it is affected neither by air nor moisture; in other words, it does not oxidize even when exposed to high temperatures, forging, etc. Chlorine and nitromuriatic acid act upon platinum with great difficulty and are its only solvents. Since it withstands heat and chemical action, platinum is employed in making crucibles and various disks for use in chemical laboratories. Platinum combines with gold, forming a very fusible alloy; with iridium it makes an alloy possessing an excellent and durable surface for engraving; and it is used for scales on astronomical instruments. The standard yardstick and meter are constructed of this alloy. Several methods are employed in extracting platinum from its accompanying metals, which are known as wet or dry. In the wet method the processes are chemical, and in the dry methods the chief agent is heat. Its value per pound is nearly equal to that of gold. See METALLURGY; ALLOY.

Pla'to (427-347 B. C.), the great Athenian philosopher, born in Athens two years after the death of Pericles. He was of noble family, his father being descended from Codrus, the last King of Athens, and his mother from Solon, the famous Greek lawgiver. His original name was Aristocles, and he was called Plato (from Greek *platon*, broad) possibly because of his broad forehead, but probably because of his broad athletic shoulders. Only the most meager outline of his life is known to us. Born in the center of Greek thought and activity, he doubtless received the usual education of the aristocratic Athenian youth in music, gymnastics and general culture. At the age of 20 he was a writer of poetry and had distinguished himself in the Isthmian and probably in the Olympian games. Related by descent and living kinship to men actively engaged in politics, he nevertheless decided to devote himself to the pursuits of the scholar, influenced in part, perhaps, by the growing decay of the Athenian state.

In 407 B. C., after having already studied the Heraclitic philosophy, he met Socrates. This determined his future course of life. With the great master he spent the next eight years in intimate companionship and became his most appreciative and influential disciple. After the death of Socrates, Plato probably went to Megara, where he studied the Eleatic philosophy with Euclid, his former fellow student; after which he is reported to have traveled extensively, visiting Cyrene, Egypt, Italy and Sicily. In Syracuse he made the acquaintance of the elder Dionysius and Dion, his brother-in-law. In Magna Græcia he came in contact with the Pythagoreans, from whom he seems to have gained an increased interest in practical life and public affairs.

After 10 or 12 years spent thus in travel, he returned to Athens and, in 387 B. C., the exact middle of his life, established the "Academy" on his small estate

next the Gymnasium of Academus (hence the name of the school), a mile from Athens on the road to Eleusis. In this quiet retreat he surrounded himself with an interesting circle of pupils and taught and wrote for 40 years, until his death. During this time, however, he made two visits to Syracuse, where he hoped through the younger Dionysius to realize his dream of a state in which "the king should be a philosopher, or a philosopher the king." But in this he was disappointed, and returned to his seclusion to immortalize his ideal in his *Republic* and *Laws*.

The philosophy of Plato, as set forth in his writings, is chiefly in the form of *Dialogues*, in most of which Socrates is represented as the chief speaker. He thus perpetuates both the teachings and the method of his master. It is impossible, however, to separate the philosophy of the one from that of the other. The starting point and inspiration are from Socrates; the elaborated system is that of Plato. His philosophy united the scattered elements of the earlier thinkers and for the first time systematized philosophy in the three divisions of logic (or dialectics or metaphysics), physics and ethics. For, while this division was not formally made by Plato in set terms, he furnished the basis for its express recognition by his disciples Xenocrates and Aristotle.

With Plato the term *dialectic* is used to designate the art of arriving at knowledge by means of question and answer; hence, also, to indicate the art of thinking correctly; and finally, as a name for the science of the true and unchangeable, the science of being. The nature of ultimate being he sets forth in his doctrine of *ideas*. The objects about us are but dim and imperfect representations or shadows of a more perfect model or type which exists behind the scenes. This perfect type is what he means by *idea*. Thus, in the world of reality beyond our senses, exists the perfect tree or house, which are imperfectly represented by the trees and houses that we know through our sensations. He pictures men as

chained in a dark cave with their backs to the light, and they mistake for the real things the dim and wavering images upon the wall. Some of these prisoners, the philosophers, burst their bonds, turn to the light and climb painfully to the mouth of the cave, where their bewildered eyes gradually grow accustomed to looking upon the real or perfect things. As a corollary to this doctrine of ideas follows Plato's poetical doctrine that the art of learning is merely the remembrance of past ideas.

In the part of his philosophy that may be called *physics*, Plato deals with the existing world of nature. In this he is less interested, because it is not the real world. It is rather the image of the real world. As such, however, it is the expression of the reason inherent in the true world of ideas, and hence is an organism of order, harmony and beauty in which the good actualizes itself. The soul, as a part of the world of nature, possesses the same character as the world-soul, and is therefore rational and indestructible. In thus exalting spirit over sense and matter, Plato shows, perhaps more clearly than anywhere else, the impress of Socrates.

In his *ethics* Plato makes the highest good to consist in exaltation into the pure and Godlike life of the world of ideas. Virtue in his philosophy also, as with Socrates, is primarily knowledge of the good. Its realization on earth forms the subject matter of the *Republic*, in which he pictures the ideal state that would give righteous expression to ethical relationships among men,—a work that is perhaps the best known and most practically influential of all his writings.

The soaring genius of Plato brought Greek philosophy to self-consciousness, and in him it reaches its development. His system was the first complete interpretation of the actual and spiritual universe in accordance with a single philosophical principle, and is the type of all higher speculation. It has been a treasure-house from which men have drawn ideas and inspiration during all the succeeding centuries and in all lines of

thought and activity. In philosophy and in politics, in science and in art, in literature and in religion his influence has been incalculable. This is partly due to the form in which his ideas are expressed. His writings are not systematic treatises, but charmingly suggestive essays and dramatic dialogues, representing the highest perfection attained by Greek literature. They have for this reason appealed to a wide range of readers and carried their fruitful message into every avenue of life. The *Dialogues* attributed to him are 35 in number, of which all but seven are certainly genuine. Among the most noted of these are the *Symposium* (on Love), the *Phædo* (on the Immortality of the Soul), the *Republic* (on the Ideal State), the *Theætetus* (on the Nature of Knowledge), the *Timæus* (on the Physical World), the *Apology* and the *Laws*. The best English translation of Plato is Jowett's. See SOCRATES; ARISTOTLE; PHILOSOPHY.

Platts'burg, N. Y., county seat and port of entry of Clinton Co., 137 m. n.e. of Albany, on Lake Champlain, at the mouth of the Saranac River and on the Delaware & Hudson and the Chateaugay railroads. It has a commodious harbor on Cumberland Bay and is an attractive summer resort. The Plattsburg Barracks located here are among the largest in the United States, occupying a reservation of nearly 700 acres. There are also the Federal Government Building, a state normal and training school, homes for aged women and friendless children and four libraries. About two miles distant is Cliff Haven, the seat of the Roman Catholic Summer School of America. Plattsburg is a port of entry for the Champlain customs district and controls large lumber interests. It has manufactories of sewing machines, flour, pulp and paper, etc., and has large exports and imports.

Plattsburg was settled in 1784 by a company from Long Island headed by Zephaniah Platt, for whom the place was named. Off Valcour Island, near by, on Oct. 11, 1776, occurred the first naval battle ever fought between American and British fleets. Plattsburg was the headquarters of the United States forces on the northern frontier during the War of 1812, and on Sept. 11, 1814, in Plattsburg (or Cumberland) Bay, was fought the famous Battle of Lake Champlain under Commodore Macdonough. Population in 1920, U. S. Census, 10,909.

Plattsburg, Battle of, a double engagement of the War of 1812, fought at Plattsburg, N. Y., and on Lake Champlain, on Sept. 11, 1814. The month previous Sir George Prevost, with 14,000 men and 16 vessels, aided by Commodore George Downie, had come from the St. Lawrence to attack the 3500 American troops and 4000 militia intrenched at Plattsburg under General Macomb, and the fleet of 14 vessels under Captain Macdonough on Lake Champlain. On Sept. 5, the English were eight miles away; as they advanced in double column on the following day, they were somewhat checked by the American militia, but, finally reaching the north bank of the Saranac River, on the 11th they tried to cross in two places. Simultaneously the rival fleets fought fiercely for over two hours in Plattsburg Bay, the British, who lost their commodore and about 200 men, being defeated. Tidings of the British defeat came to the fighting armies at the crisis of the battle, as a result of which the Americans were victorious. The British fled, leaving behind their disabled and their stores, and on Sept. 24 they returned to Canada. This was one of the most important engagements of the war, for after it no further attempt to invade the United States was made.

Plau'tus, Titus Maccius (about 254-184 B. C.), the greatest comic dramatist of ancient Rome, born at Sarsina, in Umbria. He was first employed with actors, and later his penniless condition forced him to turn a hand mill in the service of a baker. At about 30 years of age he had begun to write plays, but of his 130 productions only 20 are now extant. His dramas followed Greek originals, and many were almost entirely translations or adaptations. He was

original in developing the lyrical element, and his meters as well as plots are varied. He enjoyed great contemporary admiration because of his vivacious humor. He has been widely translated, and imitated by Shakespeare, Lessing, Molière, Dryden and Addison. Among his works are *Amphitryo, Asinaria, Aulularia, Cistellaria, Mercator, Persa, Truculentus* and *Vidularia.*

Pleasonton, *Plez' un tun,* **Alfred** (1824–1897), an American soldier, born at Washington, D. C., and educated at West Point. He served on the frontier and in Mexico, during the Civil War was conspicuous at South Mountain, Antietam, Fredericksburg, Chancellorsville and Gettysburg, and on being transferred to the West in 1864, forced the Confederates from Missouri. At the close of the war he was brevetted major-general in the regular army, which he left two years later, in 1871 becoming president of the Terre Haute & Cincinnati Railroad.

Plebeians, *Ple be' yans.* See ROME, ANCIENT, subhead *Classes of Society.*

Pleiades, *Ple' ya deez,* a group of stars in the constellation Taurus, sometimes called the Seven Sisters. Six of the seven stars can easily be seen with the naked eye, and to some a seventh is visible. Legend says that they are the seven daughters of Atlas and were translated to the sky to rescue them from the pursuit of Orion. Other legends differ. The constellation is conspicuous, though the stars are small and the cluster close. It is sometimes erroneously called the Little Dipper. See CONSTELLATIONS; STARS; ORION.

Pleura, *Ploo' ra.* See LUNGS.

Pleurisy, *Ploo' ri sy.* See LUNGS.

Pleurisy Root. See BUTTERFLY WEED.

Plin'y the Elder (23-79), an Italian author, born probably at Novum Comum, in the northern part of Italy. He received a good education in Rome, entered upon active military service, traveled extensively and became procurator in Spain shortly before Nero's death. His literary work was partly the result of systematic methods of private work during his busy public life. It was completed subsequent to his retiring to quiet life after unsuccessful attempts to practice law; and upon returning to Rome after 73, when he adopted his nephew, Pliny the Younger, to whom he intrusted a number of his valuable manuscripts and notes. His celebrated *Natural History* was published about 77. The eruption of Vesuvius in 79 attracted his attention, and his desire to study the phenomenon more closely brought him to the scene of the disaster, where he met his death as a result of the suffocating vapors caused by the eruption.

Pliny the Younger (about 61-about 113), a Roman writer, the nephew of Pliny the Elder, born at Novum Comum. He was brought up by his uncle, studied under the famous Quintilian and early gained the reputation of being a highly educated man; at the age of 19 he spoke in the Forum, and soon received numerous official appointments. In 100 he was made consul, and was appointed governor of Pontica three years later. His letters, or *Epistulæ,* give intimate glimpses of his own life and that of his contemporaries, and upon these, together with his *Panegyrics,* rests his fame. His habits of perseverance and industry resembled those of his uncle.

Plover, *Pluv' er,* a name given to certain shore birds with short neck, long legs and feet having usually three toes which are slightly webbed. The bill has a hard point, the base being covered with soft skin. The wings are long and pointed, giving the birds strong powers of flight. Upwards of 100 species are known, living in nearly all parts of the world.

GOLDEN PLOVER. This plover is about the size of the robin and is the best-known species. The upper parts are black, spotted with yellow and white; the under parts black, bordered by a white line; and the tail blackish, barred with yellow or light gray. In winter the under parts become mottled with light gray. The nest is made in a depression in moss or grass and contains four eggs spotted

with dark brown. The golden plover is a common migrant in the eastern part of the United States, where it is considered an excellent game bird. It builds

GOLDEN PLOVER

its nest in the Arctic regions and winters in Patagonia, completing during the year a journey of 16,000 m., the greatest made by any bird.

Plow, an implement for turning up a furrow in a field to prepare it for planting or sowing. The entire plow consists of a share for breaking up the ground, a beam by which the plow is drawn and handles to guide it. In general, there are two classes, moldboard and disk plows. In moldboard plows the shares differ according to the kind of work the plow is expected to do; they may be long-pointed, short or narrow. The moldboard turns the sod smoothly as the share cuts it, and the designs of moldboards also differ. The disk plow has, in place of the share and moldboard, a disk or series of disks. It is used in ground which is too dry or too sticky for moldboard plows. The sulky plow has wheels and a seat for the driver. Steam plows are pulled by an engine and operate from 5 to 20 plows at a time. Such plows are used mainly on the large farms of the Middle West. There is an average of 1,700,000 plows manufactured in the United States annually.

The first plow was made from a forked tree. One branch served as a beam, and the other was pointed at the large end and used as a rough share, while the small end served as a handle. The first cast-iron plow was made by Charles Newbold of New Jersey in 1797. The greatest improvement on this was made by James Oliver, who invented the Oliver chilled plow, so called from his process of hardening iron so as to make shares of great durability.

Gang plows, turning 55 furrows at once, are now in use. These plows are drawn by tractor engines and will plow an acre in less than four minutes. Three engines are required to operate one of these plows.

Plum, an orchard tree of the Rose Family, familiar because of its popular fruit. The tree is small, with slender branches thickly covered with light green, ovate leaves. There are three chief classes cultivated in the United States, the Japanese, the American and the European. These differ in their adaptability to various climates, and for this reason the European is found chiefly in the North and East and the Japanese

SULKY PLOW

and American in the South, the Central States and the West. Plum trees grow best in moist, clayey soil, but must be carefully cultivated. Too heavy bearing one year leaves the trees weakened and unfitted for bearing the next year; for

this reason and to keep the plums from touching each other as they ripen, the fruit should be thinned often, as many as three or four times during a season.

The favorite varieties of plums are the Lombard, Green Gage, Abundance, Burbank, Wild Goose and Damson. When ripe, they may be purple, red, yellow or green in color. They are put upon the market fresh, or dried and sold as prunes. Plums are grown in almost all parts of the United States, especially in California, Texas and Michigan. The wild plum, often found growing by roadsides or near the edges of woodlands, bears small sour fruit, but its blossoms are among the daintiest of the early spring. See DAMSON; PRUNE.

Plumba'go. See GRAPHITE, *Graf' ite.*

Plum'met, or Plumb Line, a device consisting of a pear-shaped weight, generally of lead, hanging to a string perpendicular with the horizon. Masons, carpenters and other workmen use a plumb line fastened on a narrow board to determine whether walls or other upright objects are set perfectly perpendicular, or plumb.

Plutarch, *Ploo' tark,* (about 46-about 125), a Greek writer, born at Chæronea, in Bœotia. He studied in Athens, traveled in Greece, Egypt and Italy, and during the reign of Vespasian stayed for some time in Rome, lecturing on moral philosophy and collecting material for his histories. His last years were spent in Chæronea, where he held the office of archon and that of building inspector. The best known of his writings are his parallel *Lives* of Greeks and Romans, 46 of which are extant. While the *Lives* are character sketches rather than strictly historical studies, they have exercised an enormous influence on modern literature, and are the authority for innumerable facts of history. Plutarch also wrote a large number of didactic essays and dialogues grouped under the title of *Moralia.*

Plu'to, in classical myths, lord of the lower realms of the dead, son of Saturn and Rhea and brother of Jupiter and Neptune. Proserpine, whom he abducted in his black chariot, was his queen. Though despised by men and gods, Pluto had his temple in Rome, where such sacrifices as black sheep and black oxen were offered. Sacred to him were the cypress, the narcissus and the thighs of victims. Pluto owned a helmet which made the wearer invisible.

Plutus, in Greek mythology, the god of riches, the son of Demeter and Iasion. He is represented by Aristophanes as a blind old man, but in art he is usually represented as a child in the arms of some goddess. It is from Plutus that the term *plutocrat* is derived.

Plymouth, *Plim' uth,* a seaport and borough of England in Devonshire, between the estuaries of the Plym and the Tamar rivers. It lies between Stonehouse and Devonport, and together they are referred to as "The Three Towns." The prominent buildings include St. Andrew's Church, Charles Church, the Guildhall, municipal buildings, the Royal Hotel, the public library, with its Cottonian collection (300 sketches by old Italian masters), the theater and the Athenæum. The industries embrace fisheries and shipbuilding; the manufactures, except that of chemicals, are unimportant. The trade with Australia, South America, the West Indies, the Baltic, the Cape and the Mediterranean is heavy, and the leading exports are copper, tin, lead and granite; the imports are timber and agricultural products. Plymouth has a charter dating from 1439 and represents the first English town incorporated by act of Parliament. Near the end of the 16th century Sir Francis Drake was mayor of the town, and it was from here that he set out on his expedition to sail around the world. Population of "The Three Towns," about 183,000; of Plymouth proper, about 116,000.

Plymouth, Mass., a port of entry, county seat and summer resort of Plymouth Co., 37 m. s.e. of Boston, on Plymouth Harbor, an arm of Massachusetts Bay, and on the New York, New Haven & Hartford Railroad. The town is a noted summer and tourist resort on ac-

count of its beautiful situation and historic interest. It has considerable coasting trade and the fisheries are of importance. There are iron foundries and manufactories of silks, woolens, cotton goods, cordage, nails, machinery, insulated wire, rivets and rubber goods.

Plymouth is the oldest town in New England and is celebrated as the place where the Pilgrim Fathers landed from the *Mayflower* in December, 1620. A large granite boulder, called Plymouth Rock, now covered by an open structure, marks the spot of the landing of the Pilgrims. Among the noteworthy buildings is Pilgrim Hall, erected by the Pilgrim Society in 1824-25, which contains valuable relics and historical paintings. The National Monument to the Pilgrims was completed in 1888 and dedicated in August, 1899. In the near-by Burial Hill and Cole's Hill are the graves of many of the early settlers. Population in 1920, U. S. Census, 13,045.

Plymouth, Pa., a city of Luzerne Co., 4 m. w. of Wilkes-Barre, in the Wyoming Valley, on the east bank of the Susquehanna River and on the Delaware, Lackawanna & Western Railroad. The chief industry is coal mining and shipping, as the city is situated in the heart of the rich anthracite fields of the state. The town has several collieries, hosiery and silk mills and manufactories of miners' supplies, mining drills, etc. It was first settled in 1768 and was near the border of the Connecticut Reserve. During the trouble between Pennsylvania and Connecticut in regard to this boundary it was claimed by both states. The difficulty was adjusted by the Pennamite-Yankee war in 1799. The growth of the borough has been rapid during the last few years. Population in 1920, U. S. Census, 16,500.

Plymouth Colony, a settlement made at Plymouth, Mass., in 1620, by English Separatists who had been self-exiled in Holland for 12 years. The party left Plymouth, England, in September. They sighted Cape Cod Nov. 11, and disembarked on Plymouth Rock Dec. 21. They had sailed in the *Mayflower,* in the cabin of which, before landing, a written constitution had been signed. There were 34 members in "the colony proper." Eighteen of these had wives, 14 had young children, and there were seven servants. A small military company was soon organized with Miles Standish as captain. Privation, exposure and ship fever carried off half of the colony before spring. Among these was John Carver, whom William Bradford succeeded as governor. See MASSACHUSETTS, subhead *History.*

Plymouth Company. In 1606 James I of England granted a charter to a company of men for the purpose of making settlements in America. These men formed two groups. The first, known as the London Company, was given authority to establish a colony on the Atlantic coast between 34° and 41° north latitude; the other, known as the Plymouth Company, could colonize between parallels 38° and 45°. Within the degrees of latitude where these grants overlapped, when either company established a colony, the other was not to establish another nearer than 100 m. from it. See LONDON COMPANY.

Pneumatic, *Nu mat' ik,* **Dispatch,** a system of transmitting small packages through tubes by means of air pressure. The system consists of a series of tubes forming a circuit, which is usually connected with several stations, an air compressor and carrying cases, which so fit the tubes as to make them air-tight. The carrying case is placed in the tube and the opening closed. It is then forced on its way by the pressure of air. In the pressure system compressed air is forced into the tube and pushes the case along. In the vacuum system the air is exhausted in front of the case, and it is driven by the natural pressure of air, about 15 lb. to the square inch.

In Berlin there are lines of tubes aggregating 75 m. in length, and the system is used in New York City, Philadelphia and Chicago by the post office to transmit mail to and from substations. The speed of travel depends upon the amount of pressure in the tube and the weight

of the carrying case with its load. In a three-inch tube a carrying case well loaded will travel at the rate of about 1000 yards a minute on a ten-pound pressure within the tube. The system is particularly well adapted to transport small parcels short distances, and is extensively employed in carrying memoranda, bills, etc., and cash for purchases made in department and dry-goods stores. It is also used to advantage by telegraph companies to carry written messages within their buildings. Numerous attempts have been made to transport people in large tubes by pneumatic dispatch, but they have never progressed beyond the experimental stage, and are not considered practical owing to the cost of transportation occasioned by the great pressures required. See Air Compressor.

Pneumatics, that branch of physics which treats of the physical properties of gases and vapors. The tension, diffusion, pressure, motion, weight, compressibility, etc., of air and other gases, are studied and the results applied to practical purposes. Air pumps, force pumps, bellows and barometers are among the instruments used. See Gases, Laws of; Vapor.

Pneumatic Tire, an endless, circular tube made of canvas and rubber, and filled with air under pressure. It is used on the wheels of vehicles, especially bicycles and automobiles, for the purpose of lessening vibration, jolts, jars and noise. There are three types: single tube, double tube and tubeless tires. The double-tube tires have an inner tube of rubber and canvas and an outer tube of the same materials, but much heavier and stronger. A tube containing a valve extends from the inner tube through the outer tube and the rim of the wheel for the purpose of pumping air into the tire. The outer tube is easily detached from the wheel. The single-tube tire has the inner and outer tubes vulcanized together to form one tube. A tubeless tire has an outer cover, to the inner side of which a sheet of rubber has been cemented. A continuous flap secures the tire to the rim of the wheel and keeps it airtight. On muddy or icy roads pneumatic tires with a smooth surface are likely to slip, or "skid." To prevent this, automobile tires are frequently made with ridges or other projections on the surface. A device consisting of chains crossing the tire at right angles is also used.

Pneumatic Tools, devices operated by compressed air and controlled by hand. The mechanism is generally placed in a handle and the speed or force by which the tool operates is controlled by a valve supplying the air. There are two types of these machines, one which works by giving a rapid succession of blows, and another which gives a rotary motion to the tool. To the first type belong the hammer, rammer, riveting machine, chipping tools, rock drills and calking chisels. The rotary machines are employed to bore holes in wood and to drill iron. Air is conveyed to the machines from a receiving tank having a governing device to maintain a uniform pressure. It is supplied from an air compressor by means of a hose which is generally wrapped with steel wire to strengthen it. Pressures of from 60 to 125 lb. per square inch are carried, depending upon the character of work performed and the distance from the compressor. See Air Compressor.

Pneumonia, *Nu mo' ni a,* a disease characterized by inflammation of the lung substance. It is infectious and may be contagious, and sometimes occurs as an epidemic in institutions and in families. Persons in a depressed mental or physical condition are the more easily attacked. Pneumonia is more prevalent in the spring and autumn, and begins with a chill, high fever and pain in the side, later developing into a cough with a viscid, yellow sputum and general prostration. Respiration and pulse are rapid, the cheeks flushed. Other symptoms are headache, sleeplessness and delirium. The dangerous period begins on or after the third day. The fever reaches its height and the heart is in danger. At this stage the heart should be supported

by stimulants and the fever kept down by cold packs or spongings. During the last stage the waste matter thrown off by the lungs is expelled in frequent expectorations. During convalescence the patient is in a prostrated and weakened condition and should be given tonics and fed on a nutritious diet to restore health and strength and repair wasted tissues.

Po, the largest river of Italy. It rises on Monte Viso, in the Cottian Alps, flows eastward in the valley formed by the Alps and Apennines and empties into the Adriatic Sea. Its length is 390 m. In its upper course it is fed by mountain torrents and it falls rapidly, but nearer its mouth the surrounding country is lower than its surface, and despite dikes and embankments inundations are frequent. It receives the Ticino, Sesia, Adda, Mincio, Tanaro, Trebbia and several other streams. On its banks are the cities of Turin, Casale Monferrato, Piacenza and Cremona. The delta of the river is constantly growing, due to the large amount of the sediment carried by its waters, almost equaling that borne by the Mississippi River.

Pocahontas, *Po" ka hon' tas,* (1595-1617), the daughter of an Indian chief. She lived in Virginia, and the story, based on fiction, perhaps, rather than fact, runs that she once saved the life of John Smith. She married John Rolfe, was taken to England and was converted to Christianity, taking the name Rebeccah. She died as she was returning to Virginia.

Pocatello, *Po" ka tel' o,* **Idaho,** a city and the county seat of Bannock Co., 134 m. n.w. of Ogden, Utah, on the Port Neuf River and on the Oregon Short Line, the Utah Northern and other railroads. The city occupies a commanding position being the gateway into southern Idaho and the Snake River Valley. It is situated in a volcanic region that has been made agriculturally productive by irrigation. The mineral resources include gold, silver and copper ore. Farming, mining and stock raising constitute the principal pursuits, and there is a large trade in their several products. There are extensive railroad machine shops here. The principal buildings include a courthouse, a public library, Y. M. C. A. Building and the Pocatello General Hospital. There are good business blocks and a number of churches. The foremost educational institution of the city is the Idaho State Academy. A Catholic parish school is also located here, and a state normal school is maintained during the summer. Population in 1920, U. S. Census, 15,001.

Poe, Edgar Allan (1809-1849), an American poet, critic and writer of fiction, born in Boston. His father and mother were actors, both of whom died in 1811. Edgar was adopted by a wealthy Richmond merchant, Mr. John Allan, from whom he received perhaps too indulgent treatment. At the age of six he was placed in a school at Stoke-Newington, England, and on his return to Richmond was sent to a classical school where he distinguished himself in both athletics and scholarship. He entered the University of Virginia in 1826, coming home at the end of the first year with highest honors in Latin and French, but with a gambling debt that caused his foster father to forbid his returning to college. Naturally self-willed, Poe's early training had failed to develop in him habits of self-control, and he soon broke away from his guardian. In May, 1827, he enlisted in the United States army at Boston, serving for two years with a good record. In 1830, through Mr. Allan's influence, he entered the West Point Military Academy, but was soon dismissed for willful neglect of duty, and a final quarrel with his foster father threw him entirely upon his own resources.

Previous to his dismissal at West Point, Poe had published two unsuccessful volumes of poems (1827 and 1831), but in 1833 he became known to the public by the story *MS. Found in a Bottle,* which won a hundred-dollar prize offered by the Baltimore *Saturday Visitor.* He was at this time living in Baltimore with an aunt, Mrs. Clemm, who remained a loyal and self-sacrificing friend

throughout his unhappy career, and whose daughter Virginia became his wife in 1836. Through the influence of one of the judges in the prize-story contest, Poe became editor of the Richmond *Southern Literary Messenger*. This was the first of a number of magazines in Richmond, New York and Philadelphia, with which he became connected, but one engagement after another was broken off, partly because an unfortunate appetite for liquor made him unfit for continued attention to duty. His wife, to whom he was devotedly attached, died in 1847 after several years' illness, and the strain of watching her slow decline, in the midst of their distressing poverty, is said to have aggravated his mania for drink. In October, 1849, he was found unconscious in a drinking place in Baltimore, and died in a hospital a few days later.

Poe's writings consist of literary criticisms, tales and poems. He was among the first to appreciate the genius of Tennyson and of Mrs. Browning, and in his work as a critic he showed himself an enthusiast who was sincerely eager to welcome what appealed to his taste. A passion for the beautiful that overpowered all other considerations, and a lack of spiritual insight and of scholarly training are apparent in his criticisms, which, however, have the merits of a clear and simple style and freedom from affectation.

In both his tales and poems Poe dealt with an unreal world. Like Hawthorne, he was a romancer. The stories of the author of *The Scarlet Letter,* however, are poetic in their spiritual meaning, full of melodies "too fine for mortal ear;" Poe used consciously the devices that made such stories as *The Fall of the House of Usher* and *The Masque of the Red Death* marvels of beauty, yet beauty wholly external, dependent on the choice of words, the placing of the accent, the turn of rhythm, combined in such a way as to weave a spell of unearthly fascination. A master of the detective story, Poe's intellectual strength is manifest in such clever tales as *The Murders in the Rue Morgue, The Gold-Bug* and *The Black Cat.*

His poems illustrate his theory that "poetry is the rhythmical creation of beauty," that the highest tone of beauty is sadness and that the object of poetry is pleasure, not truth. His own poetic gift did not go beyond the limits of this theory, nor could he appreciate those forms of poetry outside his scope. His poems, of which *The Raven, The Bells, Annabel Lee, Ulalume* and *To Helen* are the best known, win the reader by their haunting melody and indescribable atmosphere of weirdness and mystery, but they lack the element looked for by one who seeks in poetry something more than the beauty of form.

Poet Lau'reate, an officer in the royal household of Great Britain, appointed by the sovereign to write poems on court and national occasions. The office is largely honorary. The first poet to serve in this capacity was Ben Jonson, but it was not until the time of Charles I that a royal patent was granted for the title. The best known of the poets laureate are John Dryden, Colley Cibber, Robert Southey, William Wordsworth, Alfred Lord Tennyson and Alfred Austin. Robert Bridges is the present incumbent.

Po'etry, the representation of human feelings, thoughts and actions in rhythmical, imaginative language. The exact nature and function of poetry has long been a theme for discussion among students of this art, but it is generally accepted that poetry expresses human experiences in a language of its own, and makes a direct appeal to the emotions by means of the imagination. Poetry differs from prose in having certain qualities of style that belong peculiarly to poetic language. Although certain forms of prose produce something of the same emotional effects as poetry, yet the poet is guided by more clearly defined rules of composition than the prose writer.

ORIGIN AND DEVELOPMENT. Poetry is the earliest form of literature. In its beginnings it was directly related to music, singing and dancing, for primitive man did not think of it as distinct from

his acts of worship and his festivities. As civilization has progressed, poetry has become a definite art, governed by more or less permanent rules. At first poetry was also the expression of groups of men, while in its later aspect it represents the feelings of the individual. Poetry has had a third development in turning away from the consideration of external human experiences and emphasizing more and more the spiritual side of man's nature.

CLASSIFICATION. Poetry may be divided into three general groups, the arrangement being based on the point of view of the poet as related to his material. If he represents something as happening in the world not included in his personal experiences he produces epic, or narrative, poetry. If he expresses his inner experiences he produces lyric poetry. A combination of the two, the presentation of actions through the emotional experiences of certain characters, results in dramatic poetry. It is evident that these divisions may overlap and that certain poems cannot be placed in one particular group absolutely. For general purposes, however, the above classification will be found useful.

EPIC POETRY. The term *epic poetry* in its general sense includes all narrative poetry and is so here used. *Epic* is a term usually applied to the most important class included in the general division, sometimes known as *great epic.*

Great Epic. The great epic is a recital, in dignified and rhythmic language, of a great action carried out by heroic characters and supernatural agencies controlled by a supreme destiny. To this class belong the great Homeric poems of ancient Greece, the *Iliad* and *Odyssey; Beowulf,* the epic of early England; Vergil's *Æneid*; and Milton's *Paradise Lost.* The great epic admits of classification into two divisions: to the one division belong those epics which grew out of the ancient songs and traditions of a people and which were put finally into the form of a single poem, such as *Beowulf;* to the other belong those which are the conscious work of a single artist, such as *Paradise Lost.* All great epics are alike, however, in conforming to the definition given above. In modern times we have witnessed a decay of the great epic, for the spirit of modern civilization is unsuited to this form of poetry.

Modifications of the epic type are found in the early lays of popular heroes sung by wandering minstrels; the chronicle poems, such as Layamon's *Brut;* the psychological epic, such as Browning's *Sordello;* and the mock epic, of which Pope's *Rape of the Lock* is a conspicuous example.

Ballad. The ballad is a brief narrative poem having a romantic theme, its chief qualities being simplicity, dramatic power and the imaginative element. Ancient ballads were handed down orally and had no individual author, and, as the ballads of all nations have a marked similarity, it is probable that many of them had a common origin. The earliest-known English ballads, which date from the 13th century, are those concerning the adventures of the picturesque Robin Hood; but there are no extant manuscripts dating earlier than the 15th century. The most noted collection of early English ballads was made in 1765 by Bishop Percy. Famous among these are *Chevy Chase* and *Sir Patrick Spens.* This collection did much to arouse interest in ballad literature. In modern times many English poets have imitated the ancient ballads, but none so successfully as Coleridge in his *Rime of the Ancient Mariner.*

Lyrical Ballad. The lyrical ballad is narrative in form, but the emotional element is more important than the story, and the feeling which is developed gives the action and situation their importance, for the purpose of such ballads is to arouse the feelings. Wordsworth's *Lucy Gray* and Tennyson's *Charge of the Light Brigade* come under this class. These poems are neither purely epic nor purely lyrical in character.

Metrical Romance. The metrical romance is less formal than the great epic and has a less dignified theme. Originally it dealt with romantic episodes con-

nected with the love and adventure of an age of chivalry. In modern times the term is applied to any long narrative poem with a romantic theme. In early English literature the best example is *Sir Gawayne and the Green Knight,* a work of the 14th century. Modern masters of this form of poetry are Dryden, Scott, Byron and Morris. Scott's *Marmion* and *Lady of the Lake* and Longfellow's *Evangeline* are excellent examples of the modern metrical romance.

There are other narrative forms which are not easily classified, such as Tennyson's *Idylls of the King.* Though dignified, this poetic work is more limited in scope than the epic proper, and it also has a reflective and spiritual character not typical of the epic. Other poems of this nature are Wordsworth's *Michael* and Burns's *Tam o'Shanter.*

Descriptive Epic. In this form of poetry objects or scenes take the place of events, but the descriptive epic is narrative in form and presents the subject matter by moving through space and time. We may say that the elements of a narrative are used in such a way as to form a descriptive poem, as in Goldsmith's *Deserted Village* and Burns's *Cotter's Saturday Night.*

Lyric Poetry. The term *lyric* in its general sense is applied to that poetry which expresses the emotion of the poet or those whom he represents. The greater part of modern poetry is lyrical in character. Lyrics have a variety of form and varying degrees of emotional expression, but in general have a threefold structure. There is first presented the object or situation from which the poem arises, then the emotion is fully developed, lastly it is resolved into a thought or an attitude. Lyrics show two main types, the song lyric and the reflective lyric.

Song Lyric. The song lyric is naturally adapted to musical expression. It is more purely emotional, more spontaneous and rapid in utterance and more simple than the reflective lyric. The best lyrics of this type ever written in the English language were composed in the time of Elizabeth, for the poets of this era combined highly developed poetic imaginative powers with a finished poetical style. Shakespeare's *Hark, Hark the Lark* and Jonson's *Drink to Me Only with Thine Eyes* are among the best of the Elizabethan lyrics. Burns is the best song writer of modern times; notable song lyrics of other poets are Scott's imitations of Scottish ballad songs and Tennyson's *Sweet and Low.* The hymn is a form of this class of poetry, but hymns which have true literary value are rare, for the expository element is too often a prominent characteristic. Such hymns as Cowper's *Oh for a Closer Walk with God,* Heber's *The Son of God Goes Forth to War* and Phœbe Cary's *One Sweetly Solemn Thought* are among the best. A notable example of a song not intended for choral worship, but now so used, is Newman's *Lead, Kindly Light.*

A further development of the song lyric is found in poems which have the simplicity and spontaneity of the song, but which are more purely literary, as Wordsworth's *Daffodils* and Tennyson's *Tears, Idle Tears.* Shelley's *Skylark* is a step further in the development of this type; its wealth of beautiful figures and elaboration of language carry it out of the realm of pure song.

Reflective Lyric. In this class of lyric poetry the emotional element is important but there is also a definite intellectual element. Poems of this type are frequently serious and thoughtful. The three chief forms of the reflective type are the ode, elegy and sonnet.

Ode. An eminent literary critic has defined the ode as "any strain of enthusiastic and exalted lyrical verse, directed to a fixed purpose and dealing progressively with one dignified theme." The ode is the most intellectual of lyrical poems, and if well worked out is capable of definite analysis. The divisions of the ode are made to correspond to the ebb and flow of the poet's feeling. Two general types of the ode are recognized, the regular, or Pindaric, form and the irregular form. The Pindaric ode is an elaborately worked-out form whose divisions

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are called strophe, antistrophe and epode. These divisions vary as to length and rhyme, but the recurring strophes have each the same scheme. In the ode of irregular form each strophe is independent of the others with reference to length and rhyme scheme. Some of the best odes in the English language are irregular in form, such as Wordsworth's *Intimations of Immortality,* Tennyson's *The Death of Wellington* and Lowell's *Commemoration Ode.* Another form is the ode of the choral type, which is modeled after the odes of the Greek tragedy. Such an ode is divided into choruses and semichoruses.

Elegy. The elegy was originally a poem of lamentation for the dead, set to musical accompaniment. The Greeks and Romans applied the term to all poems written in a particular meter. The English elegy has generally been a poem treating of grief aroused by the contemplation of death. The typical elegy of English literature is Gray's *Elegy Written in a Country Churchyard,* in which the emotions that the contemplation of evening and the graves of the dead arouse in the poet, develop finally into a general reflection on the temporary nature of human life. Shelley's *Adonais* and Lowell's *Threnodia* are beautiful elegies which express the grief experienced through the death of persons the poets loved. A pastoral elegy, of which Milton's *Lycidas* is an example, is a poem in which the sorrow of the poet for his lost friend has a background of pastoral narrative or description. A brief elegy is sometimes known as a dirge.

Sonnet. The sonnet is of Italian origin. It consists of 14 verses in five-foot iambic meter, separated into two distinct groups, the division being between the eighth and ninth verses. Of the first eight verses (octave) the typical rhyme scheme is a b b a a b b a; the last six lines (sestet) have varied forms of the c d and e rhyme scheme. The sonnet in its strictest form has the idea or sentiment which it expresses introduced and developed in the first rhyme group, while in the second this theme subsides, the climax being in the eighth line. English literature is rich in sonnet poetry, though usually the sonneteers have not adhered strictly to the conventional form. Shakespeare used the English type, which consists of three quatrains and a couplet. The two-group, or Italian type, was an admirable instrument in the hands of Wordsworth, Milton, Rossetti and Mrs. Browning. Milton's sonnet *On His Own Blindness* is one of the finest in English literature.

There are other poems which need special consideration. The dramatic lyric may be defined as a poem consisting of a number of lyrics joined together to tell a story in dramatic form, as Tennyson's *Maud.* Such a poem belongs to no one class exclusively. Such a reflective poem as Wordsworth's *Excursion* or Browning's *Rabbi Ben Ezra* is a development of both lyric and epic poetry. Then there are many poems expository in character to which the terms *satiric* and *didactic* may be applied. Pope and Dryden were masters in this style of writing. Expository poetry is not, however, considered the highest type of the poetic art.

Dramatic Poetry. Dramatic poetry has elements of both lyric and epic poetry, for it presents human experience in the form of action and also expresses this experience from the standpoint of the feelings of the characters and through their words. Matthew Arnold has defined poetry as a "criticism of life." It is evident, then, that dramatic poetry gives the most complete view of life of all classes of poetry. The form of a dramatic poem is somewhat rigidly fixed. Since dramas are written to be presented in a given period of time, the length of several dramas does not vary to any great extent. All are divided into acts, usually from three to five in number. There are two prevailing classes, tragedy and comedy. The former deals with themes of great dignity and views life from an ideal standpoint. In a tragedy the outcome is failure or defeat. Comedy deals with less dignified themes and usually considers the familiar side of life. The outcome is always success-

ful. There have been no English dramas comparable to those of Shakespeare, and in modern times little poetic drama of the highest order. This may be partly explained by the fact that the modern tendency in poetry is to express the personal emotions. In a drama the poet's personality is hidden to a certain extent. See DRAMA.

POETICAL STYLE. It has been stated that the poet makes a direct appeal to the emotions by means of the imagination. The emotional elements of poetry naturally find expression in certain qualities of style. The poet in his effort to produce emotional effects uses words that he otherwise would reject, and vice versa, or clothes them with meanings which give them unusual power. A second quality of poetical style is the use of figure. The metaphor, simile and other figures are often valuable aids in the production of effective and pleasing language. Poets are also allowed a certain amount of freedom in phrasing, rhyme and vocabulary, known as poetic license, but too extreme a use of this is considered detrimental to a finished style.

RHYTHM. All poetry is characterized by a quality which we call rhythm. Rhythm is produced by the recurrence of accented and unaccented syllables and by the positions of pauses. Prose may also have rhythm, but in this form of writing there is no long-continued strain of rhythm as in poetry. Rather, there may be a series of rhythmical passages, which, however, are not repeated in corresponding types. The formal arrangement of accented and unaccented syllables to produce rhythm is called meter.

METER. A metrical line is divided into units called feet, each foot consisting of accented and unaccented syllables. In English versification the meter is determined by the number of syllables in a line, not by the quantity of the vowels, as in Greek and Latin. The most common meters in English are the iambic, trochaic, anapestic, dactylic and amphibrachic. An accented syllable is designated as long; an unaccented one, short. The iambic foot consists of an unaccented syllable followed by an accented one; the trochaic, of an accented followed by an unaccented syllable; the anapestic has two unaccented and one accented; the dactylic, one accented and two unaccented; the amphibrachic, an accented syllable between two unaccented.

In naming the meter of a line, it is customary to include the number of feet as well as the kind. A line of two feet is called dimeter, of three, trimeter; the terms corresponding to the other numbers up to six, are tetrameter, pentameter, hexameter. Longfellow's *A Psalm of Life*, for example, is written in trochaic tetrameter, and the meter would be designated in the following way:

Tell' me | not' in | mourn'ful | num'bers

This method of distinguishing metrical structure is called scansion.

TONE QUALITY. The musical quality which makes poetry so pleasing to the ear is produced mainly by alliteration and onomatopœia. Alliteration is the arrangement of sounds with reference to their similarity; onomatopœia is the selection of sounds with reference to their suggestiveness of the idea to be expressed. More specifically, alliteration is the repetition of the same letter at the beginnings of words, and in early English poetry was a regular poetic device. Now it is more sparingly used and it is employed for ornamental effect. The following line is alliterative because of the repetition of the *g* and *f* sounds:

"Glides glimmering o'er my fleecelike floor."

An onomatopoetic word by its sound suggests its meaning. Tennyson in these two lines from *The Princess* gives us an excellent impression of a sleepy summer day:

The moan of doves in immemorial elms,
And murmuring of innumerable bees.

RHYME. In the general structure of a poem we find words joined together to

form lines, known as verses, and verses joined into larger units called stanzas. The chief device for linking verses together is rhyme, or the similarity in sound between the last words of different verses. Besides its connecting use, rhyme also serves to give pleasure to the ear. One means for giving greater beauty to rhyme effect is the use of internal rhyme, where the last syllable of a line rhymes with a middle syllable. This device is used admirably by Tennyson in one of the lyrics of *The Princess:*

The splendor falls on castle walls
And snowy summits old in story.
The long light shakes across the lakes
And the wild cataract leaps in glory.

Rhyme schemes admit of a great many forms and largely determine the length of stanzas. Unrhymed poetry is frequently not divided into stanzas.

Blank Verse. The typical form of unrhymed poetry in English is verse in five-foot iambic meter, which we call blank verse. This is especially adapted to continuous narrative poetry, where continuity is obtained by absence of short stanzas, and to serious, dignified poems. An eminent critic has well expressed the scope of this noble form of verse in these words: "There is no harmony of sound, no dignity of music, no swiftness, no subtlety of languid sweetness, no brevity, no force of emphasis, beyond its scope."

Poets' Corner. See Westminster Abbey.

Poet's Narcissus. See Narcissus.

Poincaré, *Pwan" ka" ra'*, **Raymond** (1860-), a French statesman and lawyer, elected president of the republic in 1913. He was born and educated at Bar-le-Duc in the Department of Meuse, and was a promising scholar, especially in literary and mathematical subjects. His brother, Lucien, is well known as a physicist, and his cousin, Henri Poincaré, is one of the greatest living mathematicians. Poincaré's father was a public official of local prominence, and thus the son's attention was early attracted to politics; however, he followed his university career to attain his degree before he turned to law. He began his practical work as secretary to a Paris lawyer, but gave some attention at the same time to journalism. He entered politics in 1887 as deputy from his native department, Meuse. His rise in politics, though rapid, was less so than it might have been, since he frequently refused public offices for which he felt himself unfitted. Always interested in education and the arts, he became minister of public instruction and fine arts in 1893, of finances in 1894, of public instruction again in 1895 and of finance again in 1906. In each of these Poincaré fulfilled the duties of his office with dignity and thoroughness. He was vice-president of the Chamber of Deputies until 1903, when he entered the Senate.

When Poincaré was called to the premiership by President Fallières, he was said to be one of the strongest premiers of Europe, and his popularity was attested to by the French people when he was elected president in 1913 on the Republican, or Conservative, ticket. It will be observed that he was president of France during the terrible days of the World War when the very life of France, as a nation, hung in the balance. That we did not hear more of him during those trying days is due to the European conceptions of the duty of the president of a republic. The management of national affairs is entrusted to the premier; not as in our country to the president, himself. Poincaré was elected a member of the French Academy in 1910.

Point'er, a trim-built hound, probably a descendant of the foxhound and like it of use in the hunt. It has a particularly keen scent and, with nose low, follows its quarry unerringly and at great speed; when in sight of it, it stands as if petrified, with one leg lifted, body sloping, tail straight in line with the body, and nose "pointing;" thus it marks for the hunter the location of his prey. The pointer has a hard, white coat, variously spotted with black. There are several breeds, all of value to hunters.

Poi'son, any substance which, when taken into the system, exerts harmful effects upon the body cells either through absorption into the circulation or through direct chemical action upon the parts with which it comes in contact. Absorption may occur through the skin, mucous membrane or an injured surface, but is a condition essential to the action of most poisons and undoubtedly occurs to a great extent in all. In the case of those which act by producing local chemical change, however, as is the case with the mineral acids and the caustic alkalies, death in most cases may be ascribed to the local action and not to the drug, although the quantity of the poison taken exerts an important influence.

Substances which under ordinary conditions are harmless but which by reason of temperature may induce chemical changes in the part to which they are applied, as, for example, boiling water, are not properly classed as poisons. On the other hand there are substances which may generally be taken without harm, but which in large quantities have caused death, and are therefore considered poisons. Magnesium sulphate, commonly known as Epsom salt, is an example of the latter class.

Poisons may be classed as organic and inorganic, the latter comprising the alkalies, mineral acids and various compounds of phosphorus, antimony, arsenic, mercury and other metals; while to the former belong the vegetable poisons, morphine, strychnine, cocaine and the drugs from which they are obtained, as well as the poisonous organic acids. Poisonous gases are grouped by themselves; the most important of these is carbon monoxide, or illuminating gas, which acts by forming a compound in the red blood cells and rendering them incapable of transporting oxygen to the tissues. Ptomaines are substances formed by the action of bacteria upon substances containing nitrogen. Many of these are highly poisonous and are the active agents in poisoning from cheese, milk, ice cream and preserved foodstuffs. Disease germs themselves may be considered as living poisons, and infectious disease as an intoxication. Such organisms, growing in the body, produce other highly poisonous substances, known as bacterial poisons or toxins. Several of these have been isolated and are the most poisonous agents known. Infectious diseases are in large part due to their absorption.

Poisons differ greatly in the amount necessary to destroy life, and their effects are modified by many other circumstances, so that some which to most individuals are invariably harmless, may produce evil effects upon others. *Weight* and, to a less extent, *age* exert a marked influence upon the amount of any drug necessary to produce ill effects. As a rule, the fatal doses for children are much less than for adults. A *peculiarity of constitution* of an individual may modify the effects of a poison. In some persons ordinary doses of opium have caused poisoning and even death, but habit may render individuals immune to doses which to most persons would be fatal. This is daily seen in the use of opium, alcohol, tobacco and cocaine; many other drugs administered in frequently repeated doses after a time become less effective. In other instances *disease* renders the body less or more susceptible to the effect of poison. In hydrophobia or delirium tremens large quantities of opium may be administered with beneficial results, while in a case of approaching apoplexy an ordinary dose of opium might cause death.

Poisons may, therefore, be said to be only relative. Many of the active poisons are administered in small doses for their medicinal effect. With the possible exception of disease germs, there is no known absolute poison; that is, a substance that will always exert a harmful effect upon all persons regardless of the size of the dose.

ANTIDOTES. The treatment to be administered depends upon several factors, the most important of which are: the poison taken; the time which has elapsed since the taking; the quantity taken; and the point of entrance (stomach, skin or

wound). The nature of the poison may be unknown and incapable of immediate determination, in which case the treatment is conducted along general lines. If the patient is unconscious, stimulants are administered hypodermically; if inclined to sleep, he must be kept awake if possible; if faint, he must be made to lie down. If the poison has been taken by way of mouth, as is usually the case, the stomach should be emptied in most cases; exceptions to this are in case of corrosive acids and alkalies or in cases where the poison has passed on from the stomach to the blood, or to the intestines. After the stomach has been emptied, mild drinks, as starch solution, milk or gruel (one ounce of oatmeal boiled in eight or ten ounces of water) should be given in considerable quantities. It is always safe and generally beneficial to give powdered charcoal or calcined magnesia either alone or mixed.

As a rule, a person who has taken a poison by way of the mouth should be made to vomit as quickly as possible. A tablespoonful of mustard or of common salt stirred into a tumbler of lukewarm water is usually effective. Tickling the throat with a feather or something similar is a rapid method of producing vomiting; drinking warm water favors the action and assists in washing the stomach out.

Agents which are employed to prevent the action of a poison or to counteract its effect are called antidotes. Some of these act by holding the poison in suspension in the stomach and so preventing its absorption until it can be removed by vomiting or by the stomach tube. Others form a coating over the lining of the stomach and thus prevent the poison from entering the circulation. A more important class of antidotes is composed of those substances which combine chemically with the poison in the stomach to form harmless compounds or to precipitate it, rendering it incapable of being immediately absorbed. An illustration is the use of hydrate of iron in acute cases of arsenic poisoning; the arsenite of iron, which is formed, is insoluble and may be removed by any of the ways suggested above. In poisoning with opium or its derivatives, called narcotic poisoning, stimulants are administered; while if a poisonous dose of strychnine has been taken, sedatives (chloral, bromides or chloroform inhalations) are the proper antidotes. For details as to the treatment of the symptoms of poisoning by specific substances reference to the drug in question should be made, and in any case a doctor should be called if possible.

Poison Hemlock. See HEMLOCK, POISON.

Poison Ivy, a climbing shrub of the Cashew Family, to most people poisonous to the touch. It is common in fields and meadows, often found climbing over rocks or around trees. From its manner of growth and brilliant autumn coloring it is frequently mistaken for the Virginia creeper, a harmless shrub which it closely resembles. The poison ivy, however, is easily recognized by its three sharply-cut leaflets. It grows tightly upon any support to which it has attached itself

POISON IVY

and clings there by numberless rootlets. The juice is resinous and poisonous, having seemingly the peculiar property of not being poisonous to all people nor at all times to the same people. The flowers, which are small, are made up of five sepals, five petals and five stamens. They grow in slender, inconspicuous clusters and bloom in the summer. The fruit is a white or dull yellow stone fruit, resembling a berry in appearance. The poison ivy grows commonly throughout northern United States and is frequently called poison oak. It is closely connected with the poison sumac, a swamp shrub of the same genus.

Po'ker. See DRAW POKER.

Poke'weed", or Poke, a common roadside weed of the Pokeweed Family, especially common in the United States and Canada. It is a coarse herb, with thick, branching roots, which are said to be poisonous, and a thick stem often growing to a height of eight feet. The leaves are smooth, rich green in color and uncleft. The flowers form a greenish-white cluster of blossoms, each individual of which has five sepals, five petals and from 5 to 30 stamens. When mature the whole plant becomes purple in color, and the fruit is a pulpy, dark purple berry which produces a rich stain. The young shoots of the pokeweed have an agreeable taste and are eaten like asparagus. Indian poke is a local name for false white hellebore.

Poland. A nation of Europe, extending from the Baltic Sea on the north to Czecho-Slovakia on the South; from Germany on the west to the Baltic republics and Ukrania on the east. Its estimated area according to its boundaries as set forth by the treaty of Paris, is about 100,000 sq. m.; its estimated population is about 27,000,000.

THE COUNTRY. The southern province of Poland (Galicia, which it should be added is under the mandate rule only of Poland), lying on the northern flanks of the Carpathian mountains, is broken and rugged corresponding to the surface features of Slovakia on the south, but the remaining part of Poland is essentially a plain country and from this fact is derived the name of the people,—Pole, a plain. The Vistula river and its valley comprise the heart of the country, it is the cradle of ancient Polish activity, whence Polish influence extended south, east, and southeast. There are extensive marshes in the northern portion of the Polish plain, especially from Thorn north through West Prussia. The Baltic coast around the free city of Danzig is a sandy plain interspersed with dunes and lakelets.

THE PEOPLE. The Poles are a Slavic people and next to the Russians are, numerically, the most important of that race. The Poles possess the racial characteristics of the Slavic people in general, being a music-loving, poetical people. The working classes who constitute nine-tenths of the nation, have always been laborious, frugal, enduring, temperate rather than abstemious, and intensely patriotic. Their nobles have been themselves impetuous, brave to rashness, chivalrous, insubordinate, emotional, artistic. Poland has enriched the world in music, art and literature. The University of Cracow was a shining light for centuries and there was educated the great astronomer, Copernicus. All classes in Poland possess the strongly marked racial traits which kept alive their language and instinctive feeling of unity during the last century and a half of foreign oppression and is now triumphant in newly organized Poland.

INDUSTRIES OF THE COUNTRY. The plains of Poland are fertile and agriculture is the principal industry of the country. The usual crops of Central Europe are raised. The section southwest of Warsaw is the center of a vast manufacturing industry. Advantage is taken of the mineral wealth of Silesia and Galicia. Oil, salt, coal, and iron are all produced in abundance. Galicia is the richest oil producing section in Europe. The Vistula is the great commercial artery of the country. Heretofore all this wealth of natural resources has been divided and under the control of three non-

Polish nations,—Germany, Austria, and Russia,—whose interest in the country itself was that of foreign landlords. New Poland unites these diverse interests.

History. Present Poland represents the arousing to new and vigorous life of a nation supposed to have suffered the fate of Rome, and some other nations of antiquity. The Polish tribes first appeared in Poland in the tenth century. They early embraced the faith of Rome which separated them, religiously, from the Slavs of Russia and accounts for some of the repressive measures taken by Russia in her treatments of Poland. Poland and Lithuania were united politically under the Jagellon dynasty of Lithuania late in the fourteenth century. This step doubled the population and natural resources of Poland. A hundred years later, the united country was the most powerful nation in Europe, its sway extended from the Baltic to the Black Sea, from the Oder to the Dwina and Dnieper rivers in Russia.

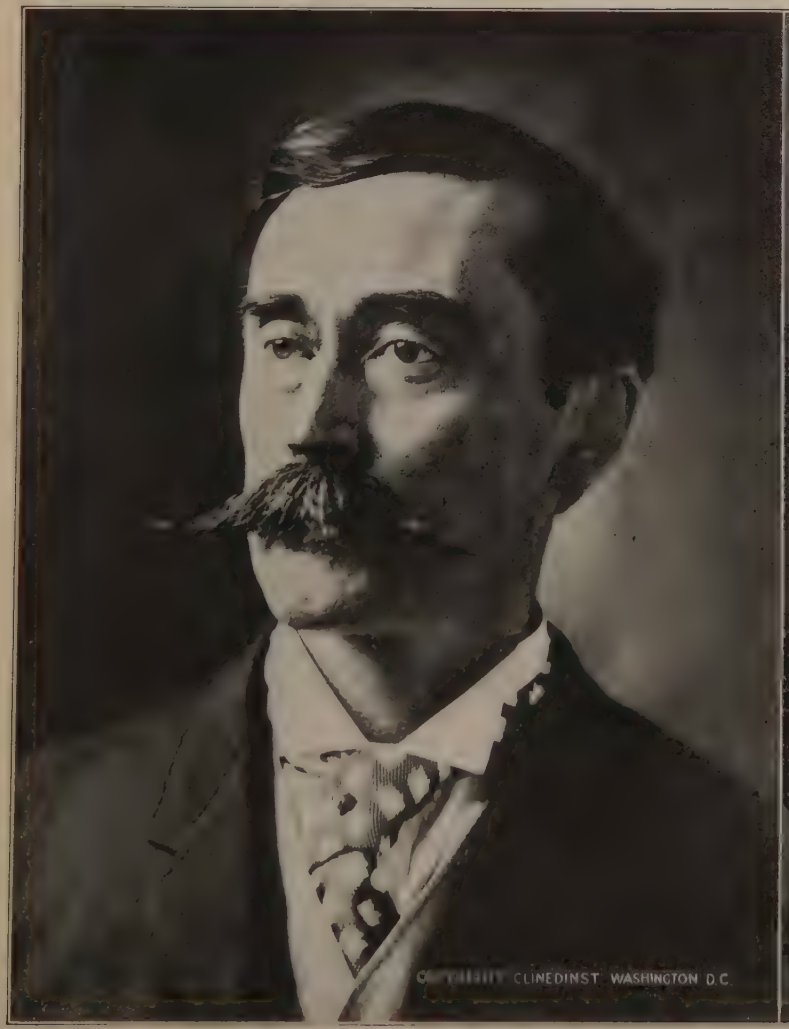
A prosperous future seemed assured; yet a period of decline came on and two centuries later enfeebled Poland ceased to exist as a nation. One reason for this decline is found in the one-sided development that the Polish people experienced in passing from the customs and traditions of ancient tribal society to modern political society, which resulted in the creation of a ruling caste,—the multitudinous nobles of Poland,—reminding the historian of ruling classes in ancient Greece and Rome. The result was that in time there was no strong central government in Poland. The office of king, theoretically elective, became so in fact, even a foreign prince being eligible. Further, since the nobles were all equal, no act of legislation was binding on the nation unless it received a unanimous vote, consequently no act was passed unless clearly to the advantage of one class of people,—the nobles. Under such circumstances Poland rapidly lost political power and finally disappeared, being divided among the better organized nations that surrounded her.

There were three partitions of Poland. In 1772, in the words of Frederick the Great, Prussia, Austria, and Russia, "Partook and communed of the body of Poland." Prussia took West Prussia; Austria, Galicia; and Russia, a large part of Lithuania. Thus Poland lost more than 80,000 sq. miles of territory. A second partition was made in 1793 and a third and final partition in 1795; after which Poland ceased to exist as an independent nation. The Poland that appeared on the map of Europe prior to the World War was simply a Russian province. Both Prussia and Russia made vigorous efforts to denationalize their Polish subjects. Austria found it to her advantage to treat her Polish subjects in Galicia with more consideration. As far as possible the use of the Polish language was forbidden in Polish provinces of Prussia and Austria. It was not allowed in schools, it was not recognized in the official life of the provinces, and a series of most oppressive laws were enacted.

Once, only, since 1795 did help seem coming to the hopeless Poland. Napoleon in the height of his power created the Duchy of Warsaw, an independent power, but that condition lapsed with Napoleon's defeat. And so dismembered Poland lived only in history until the conclusion of the World War. Then with Russia in chaos, Prussia defeated and Austria herself dismembered the day of liberation came. The Treaty of Peace closing the World War re-establishes Poland as a nation substantially as it existed in 1770.

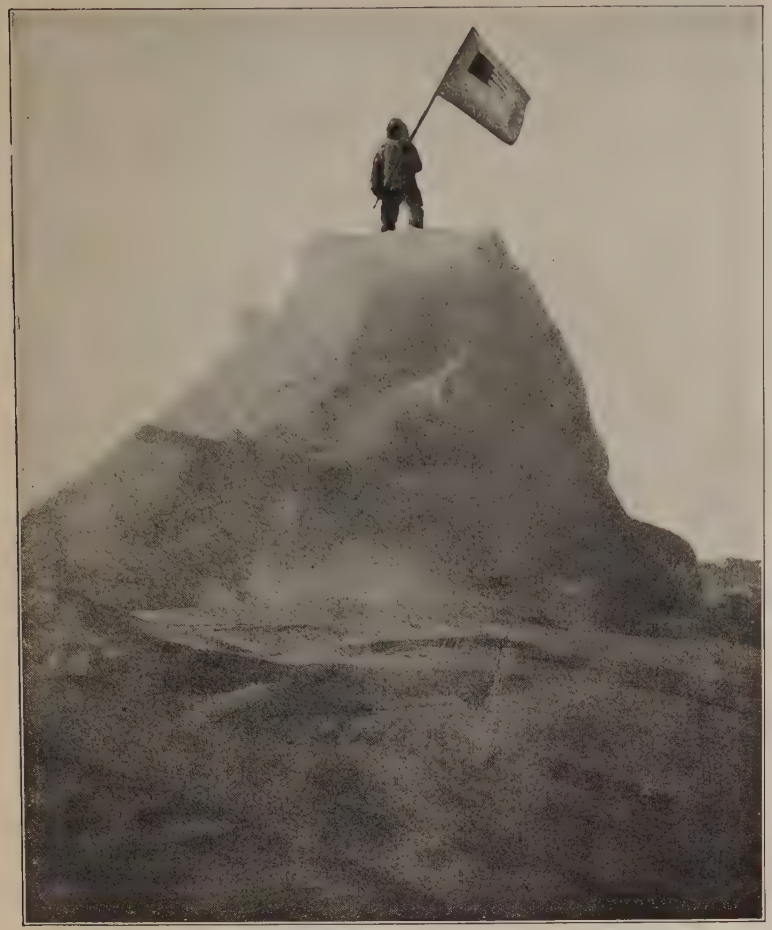
Polar Explorations. Since the opening of the present century, explorations of the polar sections of the world have been brought to a successful conclusion. The poles themselves have been reached, thus closing the Age of Discovery that began more than four centuries ago.

After the discovery of America it was evident that trade between Europe and Eastern Asia would be greatly facilitated if ships could pass from the Atlantic to the Pacific by a northwest passage. During the next two centuries many expedi-



ROBERT E. PEARY

ROALD AMUNDSEN



"STARS AND STRIPES NAILED TO NORTH POLE."

North Pole reached by Rear-Admiral Robert E. Peary, April 6, 1909.

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NORWEGIAN FLAG AT THE SOUTH POLE.

South Pole reached by Captain Roald Amundsen, December 17, 1911.

tions were dispatched by various European nations in search of such a passage, which indeed exists, but it is too narrow, tortuous and clogged with ice to serve the purposes of commerce.

The results of this long series of efforts were scientific and commercial in nature. The discovery that the Arctic waters were the natural habitat of the Greenland whales led to building up a great industry in which the principal nations of the world participated. Scientific results of great interest were also obtained. Geographically we learned the configuration of the northern extension of North America and the location of many islands, and bodies of water,—such as straits, bays and sounds, the names of which commemorate some of the early explorers as Hudson, Davis, Baffin, and Bering.

A mass of facts concerning magnetism and the action of aerial and oceanic currents was gathered. Glacial conditions in Greenland were so interesting that government expeditions were sent out to study the laws of glacial action thus throwing light on conditions in northeastern United States in a previous geological age. A study of Eskimo life opened a long sealed chapter in the customs of primitive tribes that once hunted back and forth of the front of the ice sheet, of the Glacial Age in the Ohio Valley. (For this period see FRANKLIN, SIR JOHN; KANE, ELISHA KENT; NORDENSKJOLD, NILS ADOLF ERIC; GREELY, ADOLPHUS WASHINGTON; and NANSEN, FRIDTJOF.)

DISCOVERY OF THE NORTH POLE. Robert E. Peary of the United States Navy began his work of exploration under the auspices of the United States government in 1886. He spent over thirteen years in the Arctic regions. His earlier efforts resulted simply in a further increase in geographical knowledge. But April 6, 1909, he was fortunate enough to reach the North Pole itself. For days he toiled over a confused field of ice hummocks that constituted the frozen surface of the ocean that covered the pole. Soundings showed that the ocean was 9,000 feet in depth. Directly over his head, was the North Star. He was at the one point on the earth whence, look where he would, he was looking south. All meridians met under his feet. Where he stood, there was no rotation of the surface. He was at the goal, to reach which, expedition after expedition had toiled in vain, and many men had met death amid scenes of privation and sufferings. Probably no human beings will stand again at that place for there is now no incentive to lure explorers on.

ANTARCTIC REGIONS

EARLY EXPEDITIONS. With a few exceptions all Antarctic expeditions are of recent date. Nearly all Antarctic voyages have been for the purpose of geographic exploration and free from commercial enterprises, and they have been undertaken chiefly by English, Russian, German and Scandinavian navigators. The Antarctic Circle was crossed for the first time by Capt. James Cook in 1773. But from this date to 1839 practically nothing of importance was accomplished. In that year the British Government sent out an expedition under Capt. James Clark Ross of the Royal navy. In 1841 Ross discovered Victoria land and two volcanoes, which he named Erebus and Terror, and the next year approximately located the south magnetic pole. In 1843 he sailed along this coast for 300 m., reaching 78° south. In 1899 Borchgrevink reached 78° 50′ south and located the magnetic pole about 73° 20′ south, 140° east.

RECENT EXPEDITIONS. In 1901 three important expeditions left Europe for the Antarctic regions. They were the British Antarctic Expedition in the *Discovery* under Capt. R. F. Scott, with Lieutenant Shackleton second in command; the German expedition in charge of Professor Drygalski in the ship *Gauss;* and the Swedish expedition under the direction of Dr. Otto Nordenskjöld, nephew of the Arctic explorer. Scott discovered and named King Edward Land, and by sledge journey reached 82° 17′ south. The inland journey revealed a vast snow-covered plateau

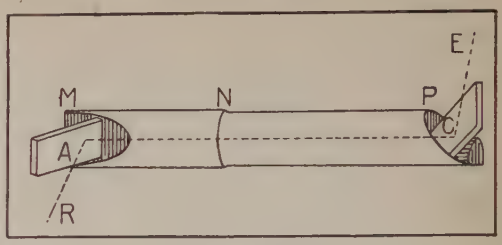
upon which were numerous high mountains. The scientific observations of Drygalski's party were of great value. The Swedish party lost their ship and were unable to accomplish anything of permanent value.

In January, 1908, Lieut. Ernest H. Shackleton left New Zealand with the determination to reach the Pole. The expedition was completely equipped. Ponies were employed for draft and pack animals, instead of dogs, and an automobile was taken for use on the ice. Its usefulness was, however, limited. Four of the ponies died during the first month, but the others did good service. By establishing depots of supplies and by careful marching, on Jan. 9, 1909, Shackleton reached 88° 23′ south, a point within 97 geographical miles of the Pole. Lack of provisions compelled the party to turn back. After incredible hardship all reached their ship. Another division of the expedition ascended Mt. Erebus, which they found to have an altitude of 13,300 ft. A third division definitely located the magnetic pole. See SHACKLETON, SIR ERNEST.

In 1911 Capt. Roald Amundsen left Europe in the *Fram,* ostensibly to sail around Cape Horn to the Pacific, thence northward to Bering Strait, through which he intended to pass to the Arctic Ocean. After rounding the Cape, however, Amundsen decided to make a dash for the South Pole. His expedition was fortunate in every respect, and he reached the Pole Dec. 17. An English expedition, under Capt. Robert Falcon Scott, reached the Pole on Jan. 18, 1912, where they found Amundsen's tent and records, but Scott and all his companions perished on the return trip. See AMUNDSEN, ROALD; SCOTT, ROBERT FALCON.

Antarctic explorations have demonstrated that there is a large land mass around the South Pole; that the greater part of this is a high plateau supporting lofty mountains. The region is without animal or vegetable life, but Shackleton found large veins of coal on the plateau. See ANTARCTIC REGION.

Polar'iscope, an instrument for studying the polarization of light. There are many different kinds, the simplest being made by fitting two tubes, M and N, together in such a manner that one revolves within the other, but protrudes



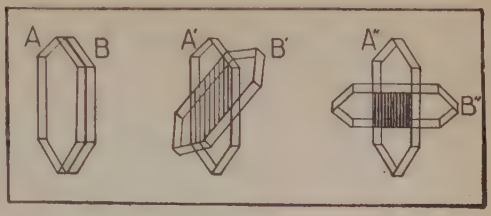
POLARISCOPE

beyond it. A plate of dark glass, A and C, is fitted to the extremity of each tube at an angle of 32° 28′. A beam of light, R, falling upon the first, or polarizing, plate, A, at an angle of 57°, is reflected through the tubes and again reflected from the second, or analyzing, plate, C, at the same angle to E. As the second tube is revolved, the final ray varies in intensity according to the angle made by the two planes of incidence. When this angle is equal to 90° the ray disappears almost entirely. Such a polariscope polarizes light by reflection. Those in practical use for experiments, or for testing the concentration and purity of various substances, generally have their analyzing and polarizing plates made of tourmaline or Iceland spar and act by refraction; one form consists of a series of mirrors arranged upon a standard and called Nörremberg's polarizer.

Po"lariza'tion of Light, the phenomenon manifested when the vibrations of light rays are made to take a single direction. In the accepted theory of light the vibrations of ether are believed to take place in a plane at right angles to the ray, although they may take place in any direction in this plane. If by any means the vibrations are cut off in all but one direction, the light is said to be polarized. Polarization is effected in many ways, probably the most common being by reflection, since the light re-

flected from water, polished surfaces or slate roofs is always polarized to a greater or less extent. This is because when light is reflected the vibrations in the plane of incidence, that is, the plane which includes the original ray and the reflected ray, are much weakened, while those vibrations perpendicular to the plane are not affected. The weakening of the vibrations in the plane of incidence depends chiefly upon the angle of incidence and upon the reflecting substance. It is, however, always greatest when the reflected ray is at right angles to the refracted ray. The angle of incidence under this condition is also called the polarizing angle. The polarizing angle for glass is 54° 35′; for water, 52° 45′; for diamond, 68°; and for quartz, 57° 32′. A simple instrument for polarizing light by reflection is described under the title polariscope (See POLARISCOPE). Whenever a ray of ordinary light is perfectly polarized, it loses at least half its intensity; this however, is not usually accomplished by reflection alone.

Polarization may be effected by refraction by allowing a ray of light to fall upon a piece of glass; a part of the ray is reflected and more or less polarized according to the angle of incidence, while another part is refracted in transmission. As the refracted ray passes out of the glass it is seen to be partially polarized and to have lost in intensity, and were it to pass through several such plates, all parallel to the first, the result would finally be an almost completely polarized ray and of less than half its original intensity. In the same manner if a beam is passed through certain crystals it is completely polarized, the process being known as polarization by absorption. Thus, if two plates of tourmaline (A B) cut parallel to their axis are laid together in the same relative position as in A′ B′, some light will pass through, but if one of the plates be rotated until the two lie at right angles to each other, as in A″ B″, the light will be entirely cut off where the two overlap. The vibrations which passed the first plate were stopped by the second. During the rotation of the plates the light increases in intensity as the second plate approaches its original position.



POLARIZATION OF LIGHT

The principle of polarization is practically applied by the custom-house department in estimating the value of sugars, sirups, etc., since these substances are able to turn the plane of polarization through an angle which varies according to the concentration and purity of the solution inserted between the two plates of the polariscope.

Pole'cat, or **Foumart,** *Foo′ mart,* a European member of the Weasel Family, fond of a poultry diet. The polecat has much the size and form of the ferret, and has coarse brown or black fur, which is varied with white markings. It has a characteristic, unpleasant odor much like that of the American skunk, and in consequence it has been practically exterminated. The American skunk is sometimes wrongly called the polecat.

Poles of the Heavens, the points in the heavens where the axes of the celestial sphere intersect. The axis of the celestial sphere passes through the earth from pole to pole, exactly coinciding with the axis of the earth, and continuing in a straight line in both directions, until it intersects the celestial sphere at opposite points. These points of intersection are the poles of the celestial sphere. The point of northern intersection is about 1½° from the North, or Pole, Star. See CELESTIAL SPHERE; ZODIAC; ECLIPTIC.

Pole Star, or **North Star.** See GREAT BEAR.

Police, *Po lees′,* a judicial and executive system and an organized civil force for enforcing the laws and maintaining

order. There are traces to be found in every organized society of some system of rules for peace and order, but a system of police, in the modern sense of the term, did not exist in ancient times. The Normans established in the north of France were the first who made stringent police regulations for the assurance of public safety. In 1794 the National Convention in France reorganized the police and defined its duties, which comprised almost every department of administrative government. Under Napoleon I the city police of Paris attained a high degree of efficiency, and today the police organization on the Continent partakes largely of a military character.

In England from the time of the Saxon kings there had existed an organization of a partially voluntary character for the repression of crime, the arrest of criminals and the maintenance of order. The population was divided into hundreds, and these into tithings, or companies of ten freeholders with their families. This system proving insufficient, the high sheriff of the county, his deputies, and the constables appointed by the parishes were substituted for the voluntary officers. In 1829 the remodeling of the police system of London led the way to the adoption of a uniform system for the whole country. In the United States the provisions for the repression of crime were copied from Great Britain. New York was the first city to have a police force organized similarly to the one adopted in London.

The ordinary police of a city are dressed in a particular uniform, while the secret police, more commonly known as detectives, are not uniformed. The regulation and control of the police in a city are usually in the hands of the municipal authorities, and the members of the force are under the direct control of a chief superintendent. In large cities the officers include assistant superintendents, inspectors, captains, lieutenants and sergeants. The cost of police maintenance is paid out of the local taxes. The secret police of the United States Government are known as secret-service agents. Canada has for a long time maintained a mounted police on its northwest frontier. See NORTHWEST MOUNTED POLICE.

Polit'ical Econ'omy, the science which deals with the production, distribution, exchange and consumption of wealth. Economic investigation must take into account the physical features of the world, the organization of industries, the causes of economic change and the various commercial policies of different nations. Its problems relate to actual conditions in the economic world of today. It is restricted almost entirely to nations that are far advanced industrially.

PROBLEMS. The method of treatment of the problems of political economy may be historical, theoretical, practical or experimental. More specifically, the problems of the production of wealth include the factors of production, land, labor and capital. Connected with the distribution of wealth are the questions of ownership of goods, the influences of government and the shares of the product, respectively, by the employers of labor and the laborers. This involves questions of profits, interest, rent, wages, taxation, direct and indirect, tariff and subsidy. The exchange of wealth, resulting from the division of labor, must take into account the problems of utility, mediums of exchange, and the purchasing power of money. Consumption of wealth, or the use of products for satisfying human wants, takes up the questions of saving, overproduction and underconsumption.

RELATION TO OTHER SCIENCES. Economics connects closely with all the sciences that have direct relation to the study of man in all his activities. For general analysis and computation it depends on the contributions of mathematics. Physiology reveals the inherent desire of man to satisfy physical hunger. In subject matter the science of political economy touches on the problems of politics, law and ethics.

HISTORY. The industrial life of the Greeks was not sufficiently developed to

formulate a distinct science of economics. Plato, Xenophon and Aristotle theorized in a limited way concerning the functions of the State, the ownership of property and the division of labor. In the Middle Ages the lack of industrial freedom hindered the formation of industrial policies. By the end of the 17th century the mercantile system, which advocated national monopoly of trade and the formation of a central economic State, was developed. The century or two which followed advocated freedom of trade, and economic speculation increased.

The Classical School originated in the 18th century. Its philosophy was utilitarian; its method, deductive. Economic principles were advanced with a positiveness similar only to that which can be expected in the natural sciences. Only a few general laws were applied and it was inevitable that the system must remain wholly ideal. Adam Smith, Malthus, Ricardo and John Stuart Mill are prominent representatives of this school. In the 19th century the principles of this school were subjected to scientific investigation. Its doctrines were abandoned and new methods and theories, influenced by the doctrine of evolution and the growing humanitarian spirit, were substituted. The German Historical School and the Socialist School stood, each in its own way, in direct opposition to the Classicists, the former investigating the evolution of industrial history in order to determine the laws of economic growth, the latter attacking the capitalists and insisting on the need for redistribution of wealth. See CAPITAL; LABOR ORGANIZATIONS; RENT; STRIKES AND LOCKOUTS; WAGES. Consult Bullock, *Introduction to the Study of Economics;* Ely, *Outlines of Economics;* Marshall, *Principles of Political Economy;* Smith, *Wealth of Nations.*

Political Offenses, those acts which are considered injurious to the State, or crimes which violate the allegiance due from a subject or citizen to the State. Those offenses committed against individuals or corporations, such as theft, murder and arson, are not political offenses. Treason and sedition are the most serious political offenses. Most countries regard political offenses lightly, and they are not included among extraditable offenses. See EXTRADITION.

Political Parties in the United States. Previous to the Revolutionary War there were no clearly defined political parties in the colonies. As the difficulties which led to that conflict increased, the colonists who resisted the aggressions of the home government took the name of Colonial, or American, Whigs, because the Whigs in England favored their cause. Those who favored the King were called Tories. However, with a breaking out of the war, most of the Tories left the country, and with their departure the first alignment of parties disappeared.

CONSTITUTIONAL CONVENTION. The government formed under the Articles of Confederation soon proved inadequate to the demands made upon it (See CONFEDERATION, ARTICLES OF), and in the years immediately following the close of the war, the states began to drift apart. Washington and others, seeing the danger, took steps to strengthen the Federal Government. These led first to the Annapolis Convention, and secondly to the Constitutional Convention (See ANNAPOLIS CONVENTION; CONSTITUTION OF THE UNITED STATES). In the latter convention the first real American political parties had their beginning. The delegates represented the classes of society which were the outgrowth of social and industrial conditions. The people of the rural districts and laborers generally desired Federal government, whose functions should be limited practically to the adjustment of foreign relations and the management of military and naval affairs. Many of these people were in debt, and they felt that they had little to gain and much to lose by establishing a strong national government, with power to regulate monetary and commercial affairs. On the other hand, the commercial class and those engaged in large business enterprises felt that their interests demanded a national government, with

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power to regulate commerce and to establish a national currency and a uniform tariff. With these questions were linked others, which together divided the forces into those favoring a strong Federal government and those who favored leaving most of the powers to the states. When the Constitution was placed before the states for ratification, the classes described aligned themselves as political parties, one advocating and the other opposing the adoption of the Constitution. They were known as the Federalists and Anti-Federalists.

FEDERALIST PARTY. The party favoring the Constitution took their name from *The Federalist*, a series of articles written by Hamilton, Madison and Jay, while the Constitution was before the states for ratification. With the adoption of the Constitution they came into power, and for 12 years held control of the government. Among their chief leaders were Alexander Hamilton, John Adams, John Jay and C. C. Pinckney. Hamilton's financial measures were carried through the influence of the Federalists, and they sustained Washington in his plans for the organization of the government. But in the Second Congress they were confronted by a growing opposition. They believed in a loose construction of the Constitution; that is, that the Constitution should be so interpreted as to give the Federal Government power to do whatever was necessary for the welfare of the country. They opposed the French Revolution and favored England in her war with France in 1793. They elected John Adams president, and under his lead passed the Alien and Sedition Laws, which made them very unpopular. (See ALIEN AND SEDITION LAWS). They opposed the War of 1812, and in 1814 members of this party from the New England States convened in a secret convention at Hartford, Conn. Holding the session with closed doors aroused such a wave of suspicion that the convention was the last act in the dissolution of the party. In the presidential election of 1816 they cast but 34 electoral votes, and after that they disappeared from national politics (See HARTFORD CONVENTION).

During the 12 years that the Federalists had control of the government they made a lasting impression upon American institutions; they organized the Senate and House on plans that have been maintained until the present time; they organized the Federal judiciary; established our foreign policy and so applied the principles of the Constitution in the administration of both domestic and foreign affairs as to establish its true position and influence in our system of government.

ANTI-FEDERALIST PARTY. The Anti-Federalists were opposed to the adoption of the Constitution, and when it was ratified they became the opponents of the government. Jefferson was their most illustrious leader. Others of note were Patrick Henry and George Clinton. During the First Congress they did but little, but during the Second Congress they became active. They opposed Hamilton's financial measures, and became champions of a strict construction of the Constitution; that is, that the Federal Government should be held strictly to the letter of the Constitution. They favored states' rights, and the French Revolution; and sided with France in her war with England. Some of the party were unwilling to follow Jefferson in his extreme measures for aiding the French Revolutionists, and before the close of Washington's administration the party divided into two wings. Soon after this, Jefferson united his followers under the name of *Republicans*. Throughout the country Democratic societies were formed on the plan of the Jacobin Clubs of France. These societies included among their members the most radical of French sympathizers and the extreme opponents of the administration. They finally united with the Republicans, and later the combination was known as *Democratic-Republican* Party. The name Democratic-Republican was afterwards changed to Democratic, and under this name the Democratic Party has existed to the present time.

DEMOCRATIC PARTY. From the time they came into power with the election of Jefferson in 1801, as Republicans, the Democratic Party won every presidential election until 1860, with the exception of two. While during its long history the Democratic Party, like all others, has changed from time to time on national issues, it has always stood for the principles of the Anti-Federalists. It has adhered to the limitation of the powers of the National Government and championed the rights and privileges of the people as a whole, and opposed a high protective tariff and a tariff favoring special industries. Although Jefferson was elected as a Strict Constructionist, he soon found his theory to be unpractical, and in the purchase of Louisiana he set his scruples aside because he saw clearly that the good of the country demanded it. Thus, when in power, the Democratic Party like other parties has advocated loose construction; and, also like other parties, whenever out of power it has advocated strict construction. For the first 30 years the party was generally known as Democratic-Republican. It carried the War of 1812 to a successful issue, though in the face of a strong opposition. However, the end of the war removed the causes of opposition, and Monroe's election was unopposed. For a time party strife was apparently allayed.

During Monroe's administration, differences were arising which caused the union of those old Anti-Federalists who were never fully in accord with the Democratic-Republicans, the remaining Federalists and others of more recent advent into political life, into a new party, which they called *National Republican*. In 1824 the National Republicans elected John Quincy Adams over Andrew Jackson, but in 1828 Jackson won with a large majority. Under Jackson's regime the old party was reorganized as the Democratic Party, and that organization has never been broken. During this time the old method of nominating presidential candidates by caucus was changed to the method of nominating by national conventions.

Although generally united on national issues, the members of the party soon began to take sides on the slavery question, the lines first being sharply drawn at the passage of the Missouri Compromise (See MISSOURI COMPROMISE). At his second election Jackson was opposed by Henry Clay, the Whig candidate (See WHIG PARTY below), and his successor, Van Buren, was opposed by William Henry Harrison, a Whig candidate. Van Buren was elected, but he received only 170 electoral votes. It is noteworthy that the national convention at which he was nominated established the rule that the successful candidate must have the vote of two-thirds the delegates. This rule has prevailed in all succeeding national conventions of the party, except that of 1860. Although Van Buren was a candidate for relection, he was defeated by General Harrison, the Whig candidate. The chief issue at the election of 1844 was the annexation of Texas. For the first time in the history of the party there was a contest for the nomination. The candidates were Lewis Cass of Michigan and Martin Van Buren of New York. Finally the two factions united on James K. Polk of Tennessee, and he was elected.

The Mexican War followed the admission of Texas. The war was approved by the members of Congress from the South, but generally disapproved by those from the North, who saw in it a movement to increase slave-holding territory. To prevent this, David Wilmot of Pennsylvania, in 1846, introduced his proviso excluding slavery from all territory acquired of Mexico (See WILMOT PROVISO). While the proviso was lost, its introduction led to an acrimonious debate, which further widened the breach between the Northern and Southern Whigs of the party.

Before the next presidential election the party in New York divided into two wings, known respectively as the Barnburners and Hunkers (See BARNBURNERS; HUNKERS). The Barnburners united with the Free-Soil Party. This gave the electoral vote of New York to

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the Whig candidate, Gen. Zachary Taylor, who was elected. The controversy over slavery became more prominent at each succeeding session of Congress, and with the hope of settling several perplexing questions, Henry Clay offered the compromise measure of 1850, which passed (See OMNIBUS BILL). This measure failed to accomplish its purpose, and the strife continued. At the elections of 1852 and 1856 the Democrats were successful, but neither administration was able to heal the breach between the Northern and Southern factions of the party. Meanwhile the growing opposition to slavery had united various factions into the Republican Party, which, in 1856, nominated John C. Fremont. The split between the Northern and Southern factions came in the nominating convention of 1860, and each faction placed a candidate in the field. A fourth party, the Constitutional Union, also had a candidate. This division gave the Republicans the election and placed Lincoln in the presidential chair. See REPUBLICAN PARTY below.

The war removed the Democratic Party for a time from any influential position in national politics, though its members in the North were, with rare exception, staunch supporters of the government. At the elections of 1864, 1868 and 1872 the Democratic candidates received only a small number of electoral votes; but at the election of 1876 the votes were nearly evenly divided. The electoral votes of several states were contested, and the party gaining these votes would win. The controversy was settled by a special commission created by Congress, which gave the votes to the Republicans (See ELECTORAL COMMISSION). The party again returned to power in 1884, with the election of Grover Cleveland. The Republicans won in 1888, but Cleveland was again elected in 1892. The financial difficulties, which occurred during Cleveland's second term, and the tariff bill passed by Congress caused general dissatisfaction.

In 1896 the party, under the lead of William Jennings Bryan, made the unlimited coinage of silver on the ratio of 16 to 1 the main issue of the campaign. A minority, not supporting this measure, also placed a candidate in the field. The Republicans gained that and the two succeeding elections. In 1900 and 1904 the party opposed the Republicans' policy in the Philippines, but in 1908 there was no vital issue between the parties. During Taft's administration the Democrats again gained control of the House of Representatives, and greatly reduced the Republican majority in the Senate.

As a result of the preferential primaries held in many states, the Democratic National Convention of 1912 had before it two leading candidates, Champ Clark, of Missouri, speaker of the House of Representatives, and Woodrow Wilson, Governor of New Jersey. After a prolonged contest, the Progressive element secured control and nominated Woodrow Wilson for president and Thos. R. Marshall for vice-president. At the November election, Wilson received 435 electoral votes, the largest number ever given a presidential candidate, and the Democrats secured majorities in both houses of Congress.

In 1916, the Democratic National Convention met at St. Louis, June 14-16, and it was conceded beforehand that President Wilson would be renominated. No opposition to his nomination developed and both President Wilson and Vice-President Marshall were renominated by acclamation, no ballots being cast. At the November election, Wilson received 277 electoral votes to Hughes' 254, the Democrats also retaining control of both houses of Congress, though with slightly reduced majority in both Houses. President Wilson immediately called Congress in extra session to act on German submarine warfare.

ANTI-MASONIC PARTY. An anti-masonic sentiment developed in New York between 1820 and 1826, which in the latter year affected town and county elections about Batavia, where one William Morgan was thought to have been murdered by the Masons because he published a book revealing the secrets of the

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order. The sentiment spread until it affected the national election in New York, Pennsylvania, Vermont and several other states. After 1831 the party died out, most of its members joining the Whigs.

National Republican Party. This is the name assumed by those who broke away from the old Democratic-Republican Party and elected John Quincy Adams in 1824. In 1831 the National Republicans nominated Clay and indorsed a protective tariff and a system of internal improvements; and demanded a cessation of removal from office for partisan purposes. Clay was defeated, and the next presidential election the party took the name of Whig.

Whig Party. The Whig Party was formed in 1834 by the union of those factions which were opposed to Jackson and his policies. The chief factions forming the coalition were the National Republicans, the Anti-Masons, the followers of Hugh L. White of Tennessee and the States' Rights Party of Georgia. The party advocated a broad construction of the Constitution, a protective tariff, a United States Bank and one term for the presidency. Among their leaders were Clay and Webster. They held no national convention in 1835, but put forth Gen. William Henry Harrison for their candidate. Harrison was defeated by Van Buren, but the Whigs exerted a strong influence during Van Buren's administration, and in 1840 elected Harrison and Tyler with a large majority. Their triumph, however, was brief. The sudden death of President Harrison placed Tyler in the presidential chair, and he soon quarreled with the party. The injection of the slavery question caused a division of sentiment between the Northern and Southern Whigs, but both factions supported the Mexican War, after it was declared. In 1848 the two factions united on General Taylor for a candidate for the presidency and elected him. Again the death of their leader brought disappointment. They supported the Compromise of 1850 (See Omnibus Bill), but became hopelessly divided on the question of slavery, and were overwhelmingly defeated in 1852. After this the party disappeared, most of the Northern Whigs joining the Republicans, and the Southern Whigs, the Democrats.

American Party. This was a small party originating in New York and Philadelphia in 1835 and 1844. Its leading doctrine was hostility to the influence of foreigners in the government. The sentiment spread, and in 1852, when the Democrats and Whigs were in a state of reformation, the party became somewhat prominent. The members were bound by a secret oath, were organized into lodges and made nominations in secret conventions. From their disclaiming any knowledge of the proceedings of the organization, the members were given the name *Know-Nothings,* and the name was transferred to the party. In the election of 1854 the Know-Nothings carried most of the New England States, New York, Maryland, Kentucky and California, and polled a large vote in the South. In the election of 1856 this vote fell off, and the party soon died out.

Liberty Party. This was a party which existed from 1839 to 1848 and had for its main purpose the opposing of slavery by political means. The members of the party were confined to the Northern States. The party was the outgrowth of an anti-slavery sentiment which had been growing for a number of years in the North. As this sentiment grew, it led to a division of the anti-slavery forces. One wing under the lead of William Lloyd Garrison, was opposed to the organization of a new party, believing that they could best secure their end by influencing members of the old parties to vote in favor of at least restricting slavery, if not in favor of abolishing it. The other wing believed that the work could be more effectively done through party organization. In 1840 this faction held a national convention at Albany, N. Y., and confirmed the nomination of James G. Birney and Francis Le Moyne as candidates for president and vice-president respectively, these nomina-

tions having previously been made at a local convention at Warsaw, N. Y. In 1844 a complete national organization was planned and Birney and Thomas Morris were made the party's candidates. At the following election the party polled over 15,000 votes in New York, most of them being drawn from the Whigs, thus giving the electoral vote of that state to Polk and assuring his election. Their last national convention was held in 1847, when they nominated John P. Hale and Leicester King. Soon after this, the Liberty and Free-Soil parties were united.

Free-Soil Party. This party was brought into existence at a meeting of anti-slavery men in Buffalo in 1848. It consisted of the Liberty Party, whose candidates for president and vice-president it accepted, and of that faction of the Democratic Party in New York who opposed Polk's nomination in 1844 (See Barnburners). In the election of 1848 the party polled nearly 300,000 votes and won 14 congressmen. In 1852 the Van Buren factions returned to the Democrats, and the strength of the party was largely reduced. When the Republican Party was formed, the Free-Soilers united with it.

Republican Party. The Republican Party, organized in 1854 at Jackson, Mich., and holding its first national convention in 1856, was brought into existence as a result of the opposition to slavery, and has no connection whatever with the Republican Party organized by Jefferson and later becoming the Democratic Party. The party was formed by the fusion of the various factions and parties who were opposed to slavery. The formation of a new party had been contemplated for two years previous to the final step, which was hastened by the passage of the Kansas-Nebraska Bill, virtually repealing the Missouri Compromise (See Kansas-Nebraska Bill). The party was composed largely of anti-slavery Whigs, Free-Soilers, Know-Nothings, Abolitionists and anti-slavery Democrats. Its most eminent leaders were Seward, Greeley, Lincoln, Chase, Hamlin, Cameron, William Cullen Bryant and a large number of others prominent in political affairs. Within two years the party secured a popular majority against slavery in 15 of the 31 states and elected 11 United States senators. The first Republican National Convention was held in Philadelphia in June, 1856. The platform demanded that Congress prohibit slavery and polygamy in the territories, and the immediate admission of Kansas as a free state. It also denounced the Ostend Manifesto (See Ostend Manifesto). They nominated John C. Fremont for president, and he received 114 electoral votes.

During the succeeding four years the party steadily gained in number and influence, and by 1859 they had control of the House of Representatives. During this time occurred in Illinois the great debate between Abraham Lincoln and Stephen A. Douglas. Though it took place within the confines of a single state, this debate was national in scope, and clearly defined the issues between the new party and their opponents. At the convention in Chicago in 1860 Lincoln was nominated, and his election placed the party in power, and from that time until 1912, with two exceptions, they won every presidential election. They carried on the Civil War, abolished slavery, reconstructed the governments of the seceding states, expanded the powers of the National Government by a broad construction of the Constitution, maintained a protective tariff, refunded the public debt, rebuilt the navy on a modern basis, established a system of civil service and added to our territory Alaska, Hawaii, the Philippines, Porto Rico and several smaller islands.

During Grant's first term abuses of public office and the harsh measures employed in some of the Southern States caused a defection, which resulted in the founding of the Liberal Republican Party. In 1872 this party came forward with Horace Greeley as their candidate for president, but they had little influence in the national election. However, during Grant's second term, the Democrats secured control of the House of Repre-

sentatives. The election of 1876 was so close that it was decided by a special commission, which seated Hayes, the Republican candidate (See ELECTORAL COMMISSION). In 1884 the party met defeat under the leadership of James G. Blaine, chiefly because a large number of the members who objected to Blaine voted for Cleveland (See MUGWUMPS). In 1888 they returned to power with the election of Benjamin Harrison, but were again defeated by the Democrats in 1892, when Cleveland was elected for the second time. In 1896 McKinley was elected with a large majority over Bryan, the Democratic candidate, the chief issue being the gold standard as a basis for our coinage. In the election of 1900 McKinley was again successful. His untimely death made Roosevelt president, and he carried out the policies of his predecessor.

In 1904 Roosevelt was elected with an overwhelming majority, and during his administration the movements for reclaiming arid lands and conserving our natural resources were inaugurated. Roosevelt retired in 1908, and William Howard Taft became his successor. The platform contained a plank pledging the reduction of the tariff, and President Taft called an extra session of Congress for this purpose. The tariff bill, which was finally passed and received the President's signature, caused general dissatisfaction, and at the next congressional election the Democrats gained control of the House.

The tariff and other issues caused a division in the party. One wing, composed chiefly of younger men in Congress, favored radical changes in the management of affairs. They objected to the tariff bill and disapproved the President's policy relating to conservation. Because of their opposition to the old leaders, the members of these factions were termed *Insurgents,* while the members of the conservative wing were known as *Standpatters.* Before 1912 the Insurgents had developed into the Progressive Republicans. These included several prominent senators.

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In the Republican National Convention of 1912, a bitter contest arose over the seating of sets of contesting delegates from several states. The conservatives secured control and nominated Presidet Taft for a second term. A number of delegates under the leadership of Theodore Roosevelt, withdrew from the convention and organized the Progressive Party. At the November election Taft received only 8 electoral votes and the Republicans lost control of both Houses of Congress.

The Republican National Convention of 1916 was held at Chicago, June 7-10, at the same time as the Progressive National Convention. An effort was made to select a candidate acceptable to both parties. Failing in this, the Republicans nominated Chas. E. Hughes and his nomination was indorsed by the Progressive Convention. At the November election, Hughes received 254 electoral votes, against Wilson's 277.

CONSTITUTIONAL UNION PARTY. This party was formed by the Whigs in the South who would not unite with either wing of the Democratic Party nor with the Republicans in 1860. It held a national convention in Baltimore and nominated John Bell of Tennessee for president and Edward Everett of Massachusetts for vice-president. It recognized "no principle, but the Constitution of the country, the union of the states and the enforcement of the laws." In the election the party carried Tennessee, Kentucky, and Virginia. It was destroyed by the Civil War.

GREENBACK PARTY. The Greenback Party was organized in a convention which met in Indianapolis in November, 1874, to oppose the return to specie payments (See SPECIE PAYMENTS, RESUMPTION OF). The platform advocated the withdrawal of all national bank currency and the substitution therefor of currency issued by the government, and the use of coin only in payment of interest on the national debt. Their candidate for president was Peter Cooper of New York, but he did not receive any electoral votes.

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Greenback Labor Party. This party was formed in 1878 by the combination of the Labor Reform Party and the old Greenback Party. It held the same theory concerning the currency as the Greenback Party and demanded an eight-hour day and the prohibition of Chinese immigration, of granting public lands to railroads and of making special grants to corporations. In 1878 they elected 14 congressmen. They held national conventions in 1880 and 1884, but never secured any electoral votes.

Prohibition Party. The Prohibition Party was formally organized at a convention held in Chicago in 1869 under the name of the National Prohibition Reform Party. Previous to this, state prohibitory laws had been enacted in a number of states, notably Maine, Rhode Island, Massachusetts, Vermont, Michigan, Iowa, New York and Connecticut. The purpose of the party was to make prohibition of the liquor traffic a national issue, and its organization was the direct result of failure of the advocates of temperance to get a prohibition plank inserted in the platforms of either the Democratic or Republican parties. The party has held national conventions and nominated candidates for each presidential election, but has not secured any electoral votes.

Populist Party, or People's Party. The Populist Party was organized in May, 1891, at a convention held in Cincinnati. It was the outgrowth of the Granger and Farmers' Alliance movements, and the delegates were chiefly representatives of the industrial classes. The platform demanded the free and unlimited coinage of silver, the abolition of the national banking system, national ownership of all means of public communication and transportation, a graduated income tax and popular election of United States senators. At the election in 1892, their candidate for president, James G. Weaver, of Iowa, received 22 electoral votes. In 1896 and again in 1900 they nominated William Jennings Bryan for president and united with the Democrats for his election, but made each time a separate nomination for vice-president. After 1900 they ceased to be influential in national politics.

Socialist Party. An organization of the Social Democratic Party was effected in New York City in 1868. The next year the party became affiliated with the International Workingmen's Party, and in 1874 a Social Democratic Workingmen's Party was formed. In 1886 the party in New York was known as the Socialist Labor Party. It supported Henry George for mayor, and in 1887 supported him for governor. In the mayoralty campaign George polled over 68,000 votes. In 1888 the Socialist Labor Party decided to have no further affiliation with other parties.

In 1897 the present Socialist Party was formed under the leadership of Eugene V. Debs and Victor L. Berger. Since 1888 the party has continued to increase in number and influence, though it has been more successful in local than in national politics. The principles to which the party is pledged are clearly set forth in their national platform for 1908. Chief among them are: collective ownership of all means of transportation and of all land; collective ownership of all industries organized on a national basis and in which competition has virtually ceased; extension of the public domain to include all mines, quarries, oil wells, forests and water power; scientific reforestation of timber lands and reclamation of swamp lands, all such lands to become permanently a part of the public domain; absolute freedom of speech, of the press and of assemblage; extension of the inheritance tax; a graduated income tax; equal suffrage for men and women; enactment of laws establishing the initiative, referendum and recall; election of judges by popular vote and for short terms and curtailing the power of injunction by legislation; improvement of labor conditions by shorter hours, increased wages and government provision of work for the unemployed.

In 1908 the presidential candidate, Eugene V. Debs, received 448,453 votes. In 1910 the Socialists carried the city

election in Milwaukee. Eugene V. Debs was again their presidential candidate in 1912. The party polled 923,086 votes.

Progressive Party. The formation of the Progressive Party was the culmination of a movement developing in both the Republican and Democratic parties, but one which had a larger following in the Republican Party. The Republicans in Congress who were dissatisfied with methods in vogue in the Senate and House, and who felt that the government was being taken from the people and placed in the hands of representatives of the privileged classes, organized on Jan. 21, 1911, the National Progressive Republican League. In October, 1911, a National Progressive Republican Conference was held in Chicago at which Robert M. La Follette was indorsed for the presidency. Senator La Follette began his campaign in January, 1912, but failing health compelled him to curtail somewhat his preelection speaking tour. He went to the Republican National Convention with little support. Early in 1912 Ex-President Roosevelt announced his willingness to accept the nomination for president, and during the spring primaries made a remarkable speaking tour, with the result that he went to the convention with a large number of delegates pledged to vote for him who had been selected by direct vote of the people. Several states had selected delegates on the old plan, so that an unusual number of contests were brought before the convention. These contests were nearly all decided against the progressive delegates. Had these delegates been seated, the progressive wing would have had a majority in the convention. They alleged their defeat to be a "steal," and under the leadership of Roosevelt this wing organized the Progressive Party. It was later joined by many former adherents of the various existing parties.

The Progressive Party held its National Convention in Chicago in August, 1912, and nominated Theodore Roosevelt for president and Hiram W. Johnson, governor of California, for vice-president. The keynote of their campaign was: "Let the people rule." The platform favored a corrupt practices act; suffrage for women; national conservation; reform of the currency; initiative, referendum, and recall. At the November election, Roosevelt and Johnson received 88 electoral votes, the Democratic candidate, Woodrow Wilson, being elected.

In 1916 the Progressive Party and the Republican Party both held their National Conventions at Chicago, June 7-10, and an effort was made to agree upon a candidate acceptable to both parties. This having failed, and the Republicans having nominated Chas. E. Hughes, the Progressives again nominated Theodore Roosevelt for president. Roosevelt declined the nomination, and indorsed Hughes, whereupon the Progressive Convention indorsed Hughes, and the party organization came to an end.

Polk, *Poke,* **James Knox** (1795-1849), eleventh president of the United States, born in Mecklenburg County, N. C., of Scotch-Irish ancestry. His father, Samuel Polk, was a farmer and surveyor of some property and standing. James was brought up on the farm and assisted in its activities. He also frequently accompanied his father on his surveying expeditions, sometimes for weeks at a time. After instruction in the common schools and by private tutor at home, he entered the University of North Carolina as a sophomore in 1815 and graduated in 1818, taking first honors in classics and mathematics. The next year he entered the law office of Felix Grundy, then at the head of the Tennessee bar. Here he formed the acquaintance of Andrew Jackson, whose consistent supporter he became. In 1820 he was admitted to the bar and located at Columbia, where he gained immediate and continued success in his profession.

Brought up as a Jeffersonian Democrat, Polk early entered politics, and his effective oratory made him much in demand as a public speaker. In 1823 he became a member of the Tennessee Legislature, and two years later was elected to Congress. Here he was one of the youngest members, but his habits of la-

borious study soon won recognition. His maiden speech was made in defense of the proposed constitutional amendment in favor of the election of president and vice-president by direct vote; and the wealth of material and force of argument displayed at once placed Polk in the front rank of congressional debaters. He opposed the appropriation of Federal funds for public improvements in the states and supported President Jackson in his policy against a central national bank. From 1835 to 1839 he was speaker of the House and gave his enthusiastic support to President Van Buren.

Polk was elected governor of Tennessee in 1839 and served for one term. In 1844 his pronounced convictions in favor of the annexation of Texas led to his nomination for the presidency of the United States. After an exciting campaign, in which the Oregon boundary question also figured, he was elected over the Whig candidate, Henry Clay. He surrounded himself with an able cabinet, and had an unusually eventful administration. The dispute over the boundary line between Texas and Mexico led to the Mexican War. The boundary between Oregon and the British possessions was settled by compromise on the 49th parallel; an independent subtreasury system was adopted; public warehouses were established; a treaty with Granada secured right of way across the Isthmus of Panama for United States citizens; and the department of the interior was created. Polk continued to oppose the use of Federal funds for internal improvements and did what he could to discourage further agitation of the slavery question. He declined a renomination and retired to private life at the expiration of his term of office, dying the following year.

George Bancroft, the historian, a member of his cabinet, characterizes Polk as follows: "He was the most thoroughly consistent representative of his party. Never fanciful or extreme, he was ever solid, firm and consistent. His administration, viewed from the standpoint of results, was perhaps the greatest in our national history, certainly one of the greatest."

Polk, Leonidas (1806-1864), an American soldier, born in Raleigh, N. C. He was educated at the state university and at West Point, but resigned from the army to enter the Episcopal ministry, in 1841 becoming the first Protestant Episcopal Bishop of the Diocese of Louisiana. In this capacity he was instrumental in establishing Sewanee University, 1858. In 1861 he became a major-general in the Confederate army, with command of the defense in Missouri and Tennessee, and he first appeared conspicuously at Columbus, Ky., late that same year. Later he was division commander at Shiloh, fought at Stone River, as lieutenant-general, and led a corps at Chickamauga. For disobedience in this last battle, he was temporarily suspended and, though reinstated, refused again to enter active service. However, during the early part of 1864, he had temporary charge of the Department of the Mississippi. He was with Johnston in opposing Sherman's advance toward Atlanta, and was killed near Marietta, Georgia.

Pol'len, the dusty or sticky mass borne on the stamens of flowering plants, the office of which is the fertilizing of the undeveloped seeds. The pollen is produced in cases, called anthers, at the summit of the stamens, and is generally yellow or brown in color. When the pollen grains are fully developed the anthers open by valves or pores and distribute their contents in the way best fitted to the needs of the plant which bears them. In most plants the pollen is dry and dusty, and it is then produced in great quantities that it may be scattered by the wind or dropped directly upon the pistil, within which lie the immature seeds. If the pollen is waxy and sticky, when the anthers open it remains clinging to them; and bees or insect visitors which come to the flowers for the honey, brush against it, carrying away with them some of the sticky masses, only to rub them off again upon the pistil of the next flower. Still other plants have a peculiar springboard arrangement where-

by the pollen, when matured, is thrown forcibly from the anthers to the summit of the pistil.

The various methods of distributing the pollen leave so much to chance that every flower bears many more pollen grains than ever reach the pistil. In the vicinity of pine woods, at flowering time the air and ground are yellow with their light dust. This superabundant production of pollen insures the fertilization of the majority of pistils or at least of sufficient number to guarantee the continuation of the species. Pollen grains differ in form according to the plant upon which they are borne, and species may be recognized by a microscopic examination of the fertilizing dust.

Poll Tax. See TAX, subhead *Poll Tax.*

Po'lo, an equestrian game which is known to have flourished in the tenth century at various Eastern courts, and probably was known in Persia before the Christian Era. It was introduced into England in 1869, and to New Yorkers, in 1876. Because of the expense incident to keeping up a field, approximately 750 by 500 ft., and the cost of ponies and their maintenance, it is essentially a rich man's game; but is none the less attractive. Light posts, 24 ft. apart, at each end of the field, mark the goals. The ball used is of basswood, three and one-eighth inches in diameter, weighing about five ounces, and painted white. This is driven by mallets with cigar-shaped heads, eight or nine inches long and about two inches thick, with handles 50 or 56 inches long. The game is similar to hockey (See HOCKEY). It may be between teams of two, three or four, and is very exciting. While Newport, R. I., may be considered the American headquarters for polo, the National Association includes many clubs, and the game flourishes perhaps quite as well on the Pacific coast.

Polo, Marco (about 1250-1324), a celebrated traveler of the Middle Ages. Previous to Marco's birth, his father and uncle traveled to Cathay, or China, where they were favorably received by Kublai Khan, Emperor of the Mongols. When Marco was 21 years of age he went back with his father and uncle, who visited Venice that year. Marco soon learned the language of the country and became a favorite of the Great Khan, who advanced him from one position to another until he became governor of a province. With his father and uncle he obtained permission to visit Persia in 1292, and three years later they returned to Venice. Sometime after this, Marco Polo commanded a fleet in a war against Genoa. He was captured and confined in prison for about a year, during which time he dictated an account of his travels. This was first published in French as *The Book of Marco Polo.* It was the first account of the East given to Europeans, and the work was soon translated into a number of languages. The people and customs described were so unlike those known in Europe that many considered the work to be untrue to life and a figment of the author's imagination. Acquaintance with the Orient in subsequent years, however, proved that Polo's accounts were accurate. A revised edition of the work was published in 1904. For centuries *The Book of Marco Polo* was the only account of Oriental civilization possessed by Europeans.

Polybius, *Po lib' i us,* (about 205-about 120 B. C.), a Greek historian, born at Megalopolis, in Arcadia. He was among the 1000 noble Achæans who were taken to Rome as hostages after the conquest of Macedonia in 168 B. C. Here he lived for 17 years, becoming an intimate friend of Scipio Æmilianus, whom he accompanied on his military expeditions to Africa and assisted in the destruction of Carthage in 146 B. C. After the war between the Romans and the Achæans, he secured favorable terms for his countrymen from their conquerors, and received the honors of a grateful people. He wrote histories, in 40 books at least, of which the first five have come down to us complete and the others in part, and in them he traced the gradual extension of the Roman Empire from 266 B. C.

Polycarp, *Pol' i karp,* (about 69-155), Bishop of Smyrna, an early Christian martyr. Little is known of his life except that as a youth he came in contact with the Apostle John, that Ignatius of Antioch visited him at Smyrna, while on his way to Rome, and that he visited the Bishop of Rome, shortly before his death, to confer with him about the time of observing Easter. He suffered martyrdom by burning, when he was nearly 90 years of age. His godly life and heroic endurance of martyrdom caused his memory to be greatly revered. Of the several letters he is said to have written, only one has come down to us.

Pol'yglot Chat. See CHAT.

Polynesia, *Pol" i ne' shi a,* a term sometimes used to designate all the oceanic islands in the central and western Pacific, but which properly includes the eastern of the three great divisions of these islands. According to the latter classification, the chief groups include the Hawaii, Ellice, Phœnix, Union, Manihiki and Marquesas groups, Samoa and Tonga, the Cook, Society, Tubuai and Tuamotu groups and some lesser islands.

Polyphemus, *Pol" i fe' mus,* in Greek mythology, son of Neptune, the most famous of the Cyclopes in Sicily, was a monstrous shepherd having but one eye in the middle of his forehead. He lived alone in a cave, where Ulysses and 12 comrades, in one of the many adventures of their journey back to Greece, chanced to take refuge. When Polyphemus returned from his day's pasturing and found the intruders, he immediately blocked the mouth of his cave with a huge rock. Seizing two Greeks, he then devoured them with relish. Two more constituted his breakfast next morning. As soon as the Cyclops went out with his flocks that day, Ulysses and his remaining comrades sharpened the giant's huge staff, tempering the point in fire. The weapon was then hidden under some straw. After supper that night, Ulysses reduced Polyphemus to a drunken stupor with some wine, which he had carried from his wrecked ship. The sharpened club, at white heat, was then driven into the monster's eye. The blinded Cyclops was further foiled by Ulysses and his ingenious friends, who suspended themselves to the bellies of the rams, which he drove from the cave the following morning, thus effecting their escape.

Pomegranate, *Pom gran' ate,* a fruit-bearing tree or shrub of the Myrtle Family, or, by some authorities, placed in the Loosestrife Family. The tree is probably a native of Persia, where it grows in large groves. When wild the pomegranate is a low, thorny shrub, but under cultivation becomes a tree, growing from 15 to 25 ft. in height and having many branches, covered with shiny, green leaves. The flowers, which grow singly or in clusters at the ends of the branches, are tubular in form, with light red calyx and brilliant scarlet corolla. The fruit is orangelike in shape and color, but generally has a reddish tint on one side. The fruit contains five cells, each having many seeds, and each seed is surrounded by a sweet, juicy pulp; thus the name is derived, which means "apple full of seeds." A seedless variety in cultivation in Persia has become very popular.

In many parts of Europe the pomegranate is cultivated as a hedge or ornamental shrub, and this variety has large double flowers, but the fruit is unpalatable. In the United States the pomegranate is grown only in Florida and parts of California, since it needs an almost tropical climate. The fruit is used in making cooling drinks, and in medicine; the bark, which contains a high percentage of tannin, is made use of in tanning the best quality of Morocco leather. The scarlet pomegranate is the national flower of Spain.

Pom"era'nia, a province of Prussia, bounded by the Baltic Sea, West Prussia, Brandenburg, Mecklenburg-Schwerin and Mecklenburg-Strelitz. The total area is 11,630 sq. m. The surface is flat and the coast is generally low and indented. The Oder is the principal river and the best agricultural region lies along its banks; the principal products are barley, rye, wheat, tobacco, beets and potatoes. Cattle raising and fishing

are important industries, the smoked fish of Pomerania being famous. The manufactures are less significant, and are represented by shipbuilding, glassworks, tobacco factories, machine shops, breweries and distilleries. Due to its good harbors, the sea trade has developed rapidly.

Pomerania was originally inhabited by the Vandals, who were followed, in the fifth and sixth centuries, by the Slavic Wends, who early accepted Christianity. In 1181 the Margrave of Brandenburg obtained feudal suzerainty over Pomerania, and in 1541 the duchies of Stettin and Wolgast, or Hither and Farther Pomerania, were erected. After the Treaty of Westphalia, Brandenburg retained only the greater part of Farther Pomerania, the rest of the territory going to Sweden. In 1720, through the Treaty of Stockholm, Sweden ceded its rights to a part of Hither Pomerania to Prussia, and in 1815 Prussia obtained the whole territory. Population in 1910, 1,716,921.

Pomeranian. See SPITZ DOG.

Pomo'na, a wood nymph, Roman goddess of fruit trees, wife of Vertumnus. She was usually represented as clasping fruit, or as carrying it in a basket.

Pomona, Cal., a city of Los Angeles Co., 32 m. e. of Los Angeles, on the Atchison, Topeka & Santa Fe, the Southern Pacific, the San Pedro, Los Angeles & Salt Lake and other railroads. The Pacific Electric Railway also connects the city with Los Angeles. Pomona is situated in the Pomona Valley famed for its majestic views of the great peaks of the Sierra Madre Mountains, and is a favorite health resort and residential city. The principal industrial interests center in the cultivation of fruit, especially oranges and lemons. Other products include small fruits, sugar beets, alfalfa and walnuts. Farming, dairying and poultry raising are also among the profitable industries. Pumps and well machinery are manufactured on a large scale. Pomona has about 120 m. of well-kept streets, lined with many varieties of semitropical trees, splendid residences and lovely gardens. There are modern street-car and interurban systems. Ganesha Park is the largest of the city parks, which cover over 50 acres. The city contains about 20 churches, several of these edifices being especially handsome in their architectural construction. There is a Polytechnic High School, about ten public schools and a Carnegie library. Pomona College, a Congregational institution opened in 1888, is located at Claremont, in the vicinity of the city. The town site of Pomona was surveyed and platted in 1875. A city charter was granted in 1887. Population in 1920, U. S. Census, 13,505.

Pompeii, *Pom pa' ye,* an ancient city of Campania, Italy, overlooking the Bay of Naples, and situated at the mouth of the Sarnus River, at the base of Mt. Vesuvius. The Oscans, later conquered by the Samnites, founded the city in the sixth century B. C., and, falling partly under Roman power as early as 342 B. C., it became a Roman colony under Sulla in 80 B. C. Wealthy Romans established villas in its suburbs, and it was long a favorite resort and became also the center of a significant trade from the surrounding fertile valleys. At that time its population numbered about 20,000. The first earthquake to cause ravages occurred in 63 A. D., and in 79 occurred the fearful eruption of Vesuvius, whose ravages of a day destroyed overwhelmingly the three cities of Pompeii, Herculaneum and Stabiæ. For over 1500 years the three cities lay undisturbed, with their former site unknown, because the eruption had turned the Sarnus back from its course a considerable distance, and the sea beach was elevated, so that men had no means of discovering their original site.

In 1748 excavations into the forgotten city of Pompeii were begun by the Neapolitan Government, and the researches have met with returns rich in interest to the antiquarian. However, no articles of great value have been discovered, for only about 2000 of the inhabitants perished, and the survivors are thought to have succeeded in carrying off movable valuables, both when they were escaping

from the devastation and upon their return after the eruption had ended. It will not be until the lapse of many years that the whole ancient city can be laid bare. It occupied an area oval in form, with a circumference of two miles, and about two-thirds of the wall which surrounded it is still preserved. The town was regularly laid out with streets crossing one another at right angles and paved with hard basaltic lava. Portions of the forum—the center of the life in the city—remain, and it is occupied in the north end by the Temple of Jupiter. Other public buildings include the Temple of Venus, the Temple of Mercury, the Basilica, the Gladiators' Barracks and two theaters. The unfinished Temple of Venus is one of the most interesting discoveries, as also are the remains that have been unearthed of fugitives carrying away many valuables and checked in their progress by the ruin of the bridge over the Sarnus. Near Boscoreale a valuable silver table service has been found. Around the city are the residences of the wealthy, which may yield rich returns to excavators. Public baths, complete and interesting, were excavated in 1824. The works of art are, on the whole, inferior to those found at Herculaneum.

Pom'pey (106-48 B. C.), a famous Roman general, whose Latin name was Gnæus Magnus Pompeius. At the age of 17 he showed remarkable military skill while serving under his father in the Social War. In the struggle between Marius and Sulla he favored the cause of the latter, and was so successful in opposing the forces of Marius in Picenum that when peace was restored in Italy he was intrusted with the conduct of the war against the Marian faction in Africa and Sicily. On his return to Rome he was accorded a triumph and honored with the name *Magnus*, the Great. He next accomplished the defeat of the followers of Lepidus and of the Marian party in Spain, and brought the Servile War to an end. He was now the great popular idol, and, though formerly an aristocrat, after his election to the consulship for the year 70 B. C., he openly espoused the cause of the people. As consul he brought about the passage of a law restoring to the people the power of having tribunes. In B. C. 67-66 Pompey cleared the Mediterranean of the Cilician pirates. Between 65 and 63 B. C. he conquered Mithridates, King of Pontus; annexed Syria to the Roman dominions; and, having captured Jerusalem, made Judea tributary to Rome.

On Pompey's return to Rome he was accorded the most magnificent triumph ever given in the city, but the jealous Senate refused to ratify his acts and to grant land to his troops. He therefore allied himself with Cæsar and Crassus, the three forming the coalition known as the First Triumvirate (See CÆSAR, CAIUS JULIUS). Pompey's ties with Cæsar were further strengthened by his marriage with Cæsar's daughter Julia. Pompey remained in and about Rome while Cæsar was in Gaul. Growing jealous of the latter's success and popularity, he allied himself with the Senate against him and in 48 B. C. was defeated by Cæsar at Pharsalia. Fleeing to Egypt, Pompey was killed there by a former centurion.

Ponce de Leon, *Pone' tha da La one'*, **Juan** (about 1460-1521), a Spanish explorer born in San Servas, Spain. He was a court page and, later, governor of the eastern part of Haiti. In 1510 he was made governor of Porto Rico, being removed later by the King of Spain. In 1513 he set out, now an aged Castilian knight, to find the land of gold and of the fountain of perpetual youth reported to lie toward the north. He sighted land on Easter Day, and called the region Florida. Before setting out he had obtained a charter of governorship for life over the land he hoped to discover. He sought to colonize Florida in 1521; but was wounded by an arrow from a native, and died in Cuba.

Pontchartrain, *Pon" chahr trane'*, **Lake,** a lake in Louisiana about 5 m. n. of New Orleans. It is 40 m. long and 25 m. wide. It is navigable for steamboats, which can pass through the Rigolets Pass to Lake Borgne, and thence to the Gulf

of Mexico. Its waters are salt, owing to its connection with the sea.

Pontiac, *Pon' ti ak,* (about 1720-1769), a famous Ottawa Indian chief. He was a military genius and a capable statesman. When the French gave their Western forts to the English, Pontiac organized a confederacy which embraced most of the tribes between the Allegheny Mountains and the Mississippi. By agreement, a simultaneous attack was made May, 1763, upon 14 British posts from Oswego to Mackinaw. The Indians were very successful, all but Niagara, Pitt, Ligonier and Detroit falling before their fierce assaults. At Detroit, Pontiac himself led the attack. He was deserted by many of his allies when the treaty was made between France and England, and in August, 1765, he surrendered. Four years later he was murdered by an Illinois Indian, whose tribe was practically annihilated in vengeance by the Pottawattomies. The great chief was buried on the present site of St. Louis. Consult *Parkman's Conspiracy of Pontiac.*

Pontiac, Mich., a city and the county seat of Oakland Co., about 26 m. n.w. of Detroit and about 64 m. e. of Lansing, on the Clinton River and on the Grand Trunk, the Detroit, Grand Haven and Milwaukee, the Pontiac, Oxford & Northern and other railroads. The town is in a section of beautiful small lakes where there is much hunting and fishing; farming is successfully engaged in and the chief industries depend upon farm and forest resources. The shipping of fruit, wool and agricultural products constitutes an important activity. There are in the town machine shops, flour and lumber mills, gas- and gasoline-engine works, a foundry, a knit-goods factory, a carriage factory and factories for pumps, automobiles and farm machinery. Important features of the town are the Eastern Michigan Asylum for the insane, and a public library. Pontiac, which was named for the famous chief of the Ottawa Indians of that name, was laid out as a town in 1837 and chartered in 1861. Population in 1920, U. S. Census, 34,273.

Po'ny, a small horse especially of Iceland or Shetland Island breeds. The cold climate and scant vegetation of these regions is supposed to be responsible for the diminutive size of the ponies, many of which are less than ten hands high. Shetland ponies are shaggy little fellows of gentle disposition and great strength, considering their size. They are great pets among children and for this reason have been brought to the United States; here, owing to good feeding and proper care, the ponies after a few generations attain greater size. Commercially, a pony must be under 14½ hands high, but such Western and Mexican horses as the bronchos, mustangs and cayusas are known as ponies, regardless of their size.

Poo'dle, a medium-sized dog of the spaniel type and in intelligence standing at the head of this intelligent group. It has a narrow, protruding muzzle, short legs and a graceful body, whose form is concealed by a thick coat of wavy hair; in some breeds the hair is very long, in others it is short and tightly curled. The poodle is black or white, or a combination of the two. The poodle is a pet, is very affectionate and very apt at learning tricks.

Pool, a game of skill played with the usual billiard cue, on a table which has a pocket at each corner and one at the middle of each side, but otherwise like the regulation billiard table. There are several pool games; but since none of them requires such consummate skill as is necessary in billiards, they appeal more strongly to the amateur than to the expert. The cue ball is always white. In one game of *pyramids,* in which two or more play, the object balls are of a uniform red. At the beginning of the game these are arranged at the foot of the table in a compact triangle, the apex of which points toward the center. The balls must be driven into pockets by the cue ball; and to win, one must pocket more than his opponent.

In another game the object balls are of different colors and each is numbered. Before each shot, therefore, the player

must specify the ball that he wishes to pocket, and, if successful, its number is added to his score. In pin pool five small pins are placed in the form of a Greek cross at the center of the table on spots numbered from one to five; but only two object balls are used. These having been spotted, as in billiards, the first player shoots from the head of the table at the farther object ball, endeavoring to make one or both of them rebound from the cushions in such manner as to knock down some of the pins, which count for the numbers on which they stand. If, at any shot, the player knocks down the four outer pins, leaving the center pin standing, he wins the game. Pins knocked down are promptly respotted. The game is commonly for 31 points, and any number of persons may play. It may be further complicated by specific rules.

In bottle pool a leather bottle is set bottom up on one spot and a pin on another, while but one object ball is used. The bottle counts ten; the pin, five; and when either is knocked over, it is set up at the point where it comes to rest. Much valuable information is given in *Modern Billiards,* published by the Brunswick-Balke-Collender Company. See BILLIARDS.

Poole, *Pool,* **William Frederick** (1821-1894), an American librarian, born in Salem, Mass. He was librarian of the Brothers in Unity Society Library and compiled the first edition of his *Index to Periodicals* during his junior year. From 1852 to 1856 he was librarian of the Boston Mercantile Library, and during his 13 years of service in the Athæneum became recognized as one of the foremost American librarians. In 1853 and again in 1882 he published enlarged editions of his *Index.* He was librarian of the Cincinnati Public Library from 1869 to 1873; of the Chicago Public Library from 1873 to 1887; and of the Newberry Library, Chicago, from 1887 until his death. In 1887 he also became president of the American Historical Association. His work of indexing periodicals has been continued by W. J. Fletcher and other American librarians. He wrote *The Battle of the Dictionaries, Websterian Orthography, Cotton Mather and Salem Witchcraft* and *Anti-Slavery Before 1800.*

Pope, the Bishop of Rome and supreme head of the Roman Catholic Church. St. Peter is considered the first pope. From him each of 262 succeeding popes has inherited authority conferred by Christ's words: "Thou art Peter, and upon this rock I will build My Church. Feed My lambs. Feed My sheep." As chief guardian of the faith, the pope is empowered to define all that Christ ordered, and to point out and condemn all errors regarding revelation. In this teaching the pope is deemed infallible.

The Sacred College cooperates with the pope in governing the Church, but the pope possesses the fullest power to make for the entire Church all laws necessary for the spiritual welfare of souls. He is supreme in spiritual government. The pope is supported by a yearly offering of all his subjects. Peterpence, as it is called, was originally an annual penny offering made in England.

The pope, who is addressed as "Your Holiness," usually wears a white cassock and close-fitting cap, a red hat, red slippers embroidered in gold, a breast cross containing a relic of the true cross, a large red cape with gold lace and the "ring of the fisherman." For choir office the pope has a lace surplice, a red cape of velvet or satin, trimmed with ermine, and a red stole of satin or velvet. In solemn office he wears the pallium, the pontifical ring and the miter of three crowns.

The story of the Papacy is one of many vicissitudes leading to ultimate triumph. St. Leo the Great (440-461) tried to save for Rome the tottering Greek Church, which was being even more subverted by the emperors of Constantinople, who, by their dogmas and religious tyranny, encouraged its degeneracy and ultimate apostasy. In October, 451, four papal legates and 600 bishops assembled at Chalcedon to hear the Catholic faith proclaimed by Leo. The people of the West

heard his decrees with joy; the people of the East bitterly resented them. Despite objections to his decrees, Leo's power was so great that in 451, when Attila, King of the Huns, devastated Europe and appeared before Rome, Italy turned instinctively to Leo. Pope Leo, in official robes, met Attila on the banks of the Mincio, June 11, 452. As a result, Attila withdrew forever without touching Rome. Three years later Leo persuaded Genseric, leader of the Vandals, to spare the city from fire and sword.

For the next 300 years the Church was performing the most difficult task that has ever befallen a historic institution, that of converting Franks, Visigoths, Anglo-Saxons, Lombards and the numerous tribes beyond the Rhine. Besides, she revived religious enthusiasm among the Latins. From these many people she formed Christendom, and control of the world passed from pagan Rome when, in St. Peter's on Christmas Day, in the year 800, Pope Leo III crowned Charlemagne Emperor of the West. This great work of conversion had been possible only because of men like Athanasius and Chrysostom, Basil and Gregory, Jerome, Ambrose and Augustine.

The power of the Church gradually kept increasing with the acknowledgment of the Christian Empire under Pippin and its complete union under Charlemagne; literature was revived and schools were established, in which gathered together the learned from the entire kingdom. Much too was done in the way of science, architecture, carving and painting. Moreover, the bishops, who were now trying nearly all law cases, began to allow appeals to the pope, who thus gradually came to be considered the supreme fount of justice. But in the midst of such temporal and spiritual prosperity the Church suffered an outbreak of anarchy. Petty tyrants began selling bishoprics and other benefices to highest bidders, and Church property not destroyed by ravaging Huns and Saracens thus fell to bishops and priests who used their gains for their own ends.

Besides, the See of Constantinople now severed all connections with Rome. Worse still, because of Teutonic seizures of Church property, Church officers became vassals of various lords; consequently, during the ninth and tenth centuries, men were placed upon the pontifical throne merely to further the interests of degenerate rulers.

It was not until Otto the Great was crowned emperor that these abuses were thoroughly corrected. However, in less than a hundred years, instead of the partial freedom which Otto had assured in ecclesiastical elections, the Roman clergy and laity had once again complete power to select the pope. The final improvement came by the middle of the 11th century, when Nicholas II instituted a College of Cardinals, which was to choose the pope conditionally upon confirmation of emperors and upon approbation of clergy and laymen. Further power was given the Church because of her position in reference to the Crusades. Pope Gregory VII accomplished much for papal triumph, both spiritual and temporal, when he insisted upon the rigorous observance of celibacy among the clergy, and suppressed every vestige of simony.

Despite Gregory's good works, however, the Church had a struggle lasting 200 years, with the German Empire, after which she finally secured such national, social and intellectual influence that under the rule of Pope Innocent III (1198-1216) nearly every European ruler acknowledged the suzerainty of the Church. Now came another hard blow to the temporal and spiritual authority of the Papacy—the crowning at Lyons, France, of Pope Clement V, and his deciding on France as his future residence. This began the "Seventy Years' Captivity," that papal vassalage to the French throne which killed the civil power of the popes, diminished papal prestige and aroused throughout Christendom such suspicion and indifference as paved the way for the great "Schism of the West." Only when the cardinals and six deputies from each nation elected Pope Mar-

tin V (1417-1431) was the Catholic world again united under one spiritual head; but this peace was soon shaken by an internal conflict between the Papacy and the episcopacy.

The power and prominence, politically, territorially and spiritually, which the Papacy struggled for and gained during the next century, were suddenly challenged by the Protestant Reformation. This, denying completely the dogmatic and moral system of the old Christianity, defied papal supremacy by declaring a universal priesthood, the function of which each Christian might assume, and free choice in the matter of Church observance. The Church rebutted all attacks in the Council of Trent (1545-1563), the dogmatic decrees of which were joyfully received by every Catholic country. See REFORMATION, THE.

One last trial befell the Papacy. On Feb. 19, 1797, because of moral support against Napoleon, Pius VI was forced to sign the Treaty of Tolentino, wherein he made great territorial sacrifices. Land thus lost was restored to the Papacy by the Treaty of Lunéville in 1801, with a reservation of partial power over it. A little later this land was made a part of France, only to be restored again in 1815. During the regency of Pius IX the Piedmontese Government, aiming at Italian unity, encroached on the Church States. In the end Rome was seized on Sept. 20, 1870, and made the capital of United Italy. Each pope, however, remains in the Vatican, where his authority is supreme.

Thanks to the work of Leo XIII, the spiritual power of the Church has never been stronger than at the present day. See COLLEGE, THE SACRED; PAPAL STATES; CRUSADES; GREGORY VII; LEO XIII; PIUS X; BENEDICT XV.

Pope, Alexander (1688-1744), an English poet, born in London. His father, a wealthy linen draper, was a Roman Catholic, and the son was on this account excluded from a university career. Vain, jealous and irritable because of a physical deformity, he early withdrew to the privacy of his famous villa at Twickenham, on the banks of the Thames, where he lived the rest of his life. In 1711 he published the *Essay on Criticism,* and startled the fashionable society of London by his facility of expression and discerning judgments. The *Rape of the Lock,* one of his best works, a masterpiece of brilliance and satire, soon followed; also, his *Essay on Man.*

He was a master of the heroic couplet and attained a degree of "correctness" and perfection which exceeded anything yet reached in English poetry. Lacking in both great imagination and deep feeling, he became instead supreme among the satirists, and some of his precepts of morality were so neatly coined that they have become current for all time. His translation of Homer lacked both simplicity and directness, but was judged a splendid piece of work by his fascinated public. He also wrote *The Temple of Fame, Windsor Forest, Messiah, Epistle of Eloisa to Abelard, Elegy on an Unfortunate Lady,* the *Dunciad, Moral Essays, Imitations from Horace* and *Epistle to Dr. Arbuthnot.*

Pope, John (1822-1892), an American soldier, born in Louisville, Ky. He graduated from West Point in 1842, entering the corps of topographical engineers, and served under General Taylor in the Mexican War. Following the war he made surveys in Minnesota and the Rockies, became captain and was court-martialed for denouncing the policy of President Buchanan. In February, 1861, he escorted Lincoln to Washington, and the following May he was made brigadier-general of volunteers, with command of the Northern District of Missouri. He drove the Confederates out of the state, aided Foote in capturing Island No. 10, saw service at Corinth and was promoted brigadier-general in the regular army, in June, 1862, being summoned to Washington to command the Army of Virginia. Being almost immediately defeated at Bull Run, by Lee and Jackson, he requested to be relieved of his command and was assigned to the Army of the Northwest. Later he commanded a Southern military district during recon-

struction, in 1882 was promoted major-general and in 1886 was retired.

Pope, Sir Joseph (1854–), a Canadian public official, born in Prince Edward Island and educated at Prince of Wales College. He was private secretary to his uncle, Minister Pope of the marine and fisheries department, and to Sir John A. Macdonald, becoming undersecretary of state and deputy registrar of Canada in 1896. In June, 1909, he became undersecretary of state for external affairs. He has written several controversial pamphlets and, among other works, *The Royal Tour in Canada* and *The Flag of Canada*. King George knighted him on Jan. 1, 1912.

Pop'lar, a large group of rapidly growing trees of the Willow Family, known throughout North America, northern Africa, eastern Asia and Japan. They are easily recognized by their pale, often furrowed, green bark, their clusters of heart-shaped, rustling leaves also pale green in color, and their nearly vertical branches. The Carolina poplar, better known as the cottonwood, does not have this narrow top but spreads in massive branches. The Lombardy poplars are not native in the United States but have taken readily to this soil and climate. Their chief attractions are their massive, ridged trunks, their ready growth and their adaptability to soils which other trees disdain. The poplars have densely-flowered catkins of fragrant blossoms, and dry podlike fruit, liberating, in May, many small brown seeds. Poplar wood is used in making packing cases and for fuel.

Popocatepetl, *Po po" kah ta' pet'l,* a smoking volcano of Mexico 25 m. s.e. of the City of Mexico and about the same distance west of Puebla. The crater is a vast basin 8200 ft. in circumference and surrounded by a symmetrical cone that is only thinly capped with snow. The summit of the mountain is 17,876 ft. above the sea, and it has heavy forests reaching to a height of 13,000 ft. Sulphur, deposited during eruptions, is mined from the mountain, which is comparatively easy of ascent. Popocatepetl was in eruption in 1664, but, though not extinct, has not been active since.

Pop'py, a name given to a number of plants of the Poppy Family. They are low herbs with milky juice and much-divided leaves. The two sepals fall when the flower opens. The petals are broader at the top than at the base and thin and papery in appearance. Occasionally they are marked with black or yellow at the base and have a light or dark line about their margin. The fruit is a globular or elongated pod, with a flattened crown. The opium poppy, from which the drug is extracted, is a cultivated poppy with white or purple flowers. The celandine poppy has small yellow flowers with broad-lobed leaves. The Mexican poppy has prickly stems and sharp, pointed leaves. The California poppy, which is the state flower of California, has very finely-divided leaves and broad yellow flowers borne on an enlargement of the flower stem. It grows in great profusion in the fields of California. Recently Burbank has produced a scarlet California poppy.

POPPY

Pop'ulist Party. See POLITICAL PARTIES IN THE UNITED STATES, subhead *Populist Party.*

Porcupine, *Por' ku pine,* a family of Rodents found in both the Old and the New World. All are slow, stupid animals with a peculiar shuffling gait that is extremely deliberate. Their bodies are covered with long, barbed spines, which are a means of defense to these harmless-looking animals. If attacked, the porcu-

pine stops, puts his head between his paws and arches his back until the quills stand out like so many long spikes. Contrary to general belief the porcupine does not shoot his quills but he probably loosens them, for if they are given the slightest touch they enter the flesh of their foe, where the barbs work them in farther and farther with each movement of the muscles. Many a hunting dog, because he was too curious about the queer-looking, prickly balls, has come away with his nose full of stinging quills.

The North American, or Canada, porcupine lives generally in the pine woods and feeds upon young twigs, bark and branches. Its home is in some hollow tree or rocky crevice. The flesh of the porcupine is nourishing but not especially pleasing. Among the camps the porcupine is not in good repute. His desire for salt leads him to destroy old pork barrels, fish boxes and even tables, floors, cupboards and such articles as have contained salt. In some localities the porcupine is spoken of as the hedgehog.

Pork, the flesh of hogs which is used for food. It is marketed as bacon, ham or in other salted or cured forms, or fresh. Fresh pork, whether boiled, roasted or served as sausage, is not so digestible as beef or mutton, but much of its dangerous properties are destroyed if it is thoroughly cooked. See Hog; Meat Packing.

Porphyry, *Por' fi ry,* a term generally applied to any fine-grained mineral or minerals containing crystals of another mineral. The base is sometimes compact feldspar, sometimes jade and obsidian. The embedded crystals are usually feldspar or quartz. Porphyry varies in color, some varieties being dark red, others dark green or ocher; it is harder than marble, takes a high polish and is valuable for ornamental work. It was used by the Romans, their chief supply coming from Egypt.

Porpoise, *Por' pus,* a species of the Dolphin Family found in the gulfs and bays along the northern coasts of the United States. It attains a length of from four to eight feet and is nearly black above, though like most of the high-swimming animals it is white beneath. The porpoises are the huntsmen of the sea, for large schools of them pursue mackerel, salmon and herring, literally coursing them as hounds hunt the hare. See Dolphin.

Portage la Prairie, *Por" tazh' la Pre" re',* a city of Canada in the Province of Manitoba, situated 50 m. n.w. of Winnipeg, on the Canadian Northern, the Canadian Pacific and the Great Northern. The surrounding fertile, agricultural district yields large crops of grain and rich farm produce. The public buildings include a normal school, a business college and a collegiate institute; the waterworks and sewage system are excellent. Island Park, one of the most beautiful parks in western Canada, is located to the south of the city and is nearly surrounded by Crescent Lake. The railway connections make the city an important distributing point, and the principal industries include the manufacture of bricks, sash and doors, flour, oatmeal, pumps, cigars and farm machinery. Population in 1911, 5892.

Port Arthur, a city of Manchuria located at the southern extremity of the Liaotung Peninsula, which extends into the Gulf of Pechili west of Korea. Because of its magnificent, well-protected harbor, it has always been considered an especially desirable port. In 1891 it was fortified by the Chinese and made a naval station, but three years later was taken by the Japanese, who destroyed its fortifications. The Russians leased it in 1898, erected there vast, strongly guarded battlements, and made it one of their chief naval stations. It was considered almost unconquerable, but was forced to surrender to the Japanese in 1905. By the terms of the Treaty of Portsmouth it is now held by the Japanese.

Port Arthur, a city of Canada in the Province of Ontario, on the shore of Thunder Bay, an arm of Lake Superior, and on the Canadian Pacific and Canadian Northern railways, 630 m. n.w. of Toronto, 856 m. s.e. of Winnipeg and 200 m. n.e. of Duluth, Minn. It is con-

nected with Fort William, not far distant, by an electric line, and 16 regular steamship lines call at this port. The city is a district judicial center and a port of entry. The surrounding country is rich in gold and silver. The leading industrial establishments include a blast furnace, sawmills, foundries, stockyards, brick plants, a brewery, a stone-cutting establishment, transshipping freight houses, lake fisheries, a dry dock and shipbuilding plant, wagon works and sash, door and aerated-water factories. Large quantities of grain are shipped through this point over the Great Lakes from Manitoba and the Northwest. Population in 1911, 11,220.

Port Arthur, Tex., a seaport of Jefferson Co., on Sabine Lake and on the Kansas City Southern and other railroads, 20 m. s.e. of Beaumont. By means of a ship canal, made by deepening the channel that forms the outlet to Sabine Lake, the largest ocean vessels can enter the harbor. There are important petroleum fields in the vicinity, and the surrounding country is a fertile agricultural region. Port Arthur is an important shipping point for petroleum, farm produce, live stock and lumber. Population in 1920, U. S. Census, 22,251.

Port Chester, N. Y., a city of Westchester Co., 26 m. n.e. of New York City, on Long Island Sound and on the New York, New Haven & Hartford Railroad. It is an attractive suburb of New York City. It has a free library, public hospital and parks, and large nut and bolt works, foundries, planing mills and manufactories of sheets, shirts, etc. It was settled in 1742 and known as Saw Pit. The present name was adopted in 1837. Population in 1920, 16,573.

Port Eliz'abeth, a city of the Cape Province, South Africa, situated at the western extremity of Algoa Bay, 436 m. by sea from Cape Town. The prominent buildings include the Anglican Church, the Catholic Church, a synagogue, the Hindu Temple, the courthouse, the town hall, one of the finest hospitals in South Africa, the library, the museum and Feather-Market Hall. On the hill behind the lower town stands the lighthouse. Near by is a pyramid inscribed to Elizabeth, wife of Sir Rufane Donkin, in whose honor the town was named. The trade is extensive, the chief exports being ostrich feathers, mohair and wool, and the manufactures consisting of jam, oil, confectionery, candles and explosives. The rapid construction of railroads attendant upon the prosperity of the country has earned for the town the name of the "Liverpool of South Africa." The town is preeminently British in its characteristics. Population in 1911, 31,000.

Por'ter, David (1780-1843), an American naval officer, born in Boston, Mass. He was appointed a midshipman in 1798, having then escaped from the British service, into which he had been impressed, and as lieutenant on the frigate *Constellation*, fought the *Insurgente* in February, 1799. In October, 1803, he was captured by Barbary pirates, when the *Philadelphia* grounded in the harbor of Tripoli, and for 18 months he was held as a slave. Later, in 1812, he was commissioned captain, with command of the *Essex*, in which he cruised the Pacific in one of the most remarkable trips of history, capturing many British vessels and practically sweeping the ocean of enemies to the United States before he himself was captured, in the harbor of Valparaiso, March 28, 1814, by the British ship *Phœbe*. Following the War of 1812 he was made a commodore, commanded expeditions against the pirates in the Gulf of Mexico, and was suspended for six months in consequence of having forced the authorities at Porto Rico to apologize for an insult to his flag; thereupon he resigned, joining the Mexican navy, where he was commander-in-chief from 1826 to 1829. In the latter year he was appointed United States consul at Algiers, and when that country fell to the French, he became chargé d'affaires and afterwards American minister at Constantinople, at which post he died. He was father of Admiral David Dixon Porter, and he adopted David Glasgow Farragut in 1809.

Porter, David Dixon (1813-1891), an American naval officer, born in Chester, Pa. He entered the navy as midshipman in 1829, served throughout the Mexican War on land and on sea, and in 1861 joined the Gulf squadron with command of the *Powhatan,* a steam frigate. In 1862 he commanded 21 mortar boats and several steamers in an expedition against New Orleans, in 1863-1864 he distinguished himself on the Mississippi and Red rivers, and for services rendered at Vicksburg, in cooperation with Grant, he was promoted rear-admiral. While in command of the North Atlantic Blockading Squadron, with General Terry he rendered efficient aid in the capture of Ft. Fisher, January, 1865. He became vice-admiral the following year and admiral in 1870; meanwhile, from 1865 to 1869, he was superintendent of the Annapolis Naval Academy.

Porter, Fitz John (1822-1901), an American soldier, born at Portsmouth, N. H., and educated at West Point. He entered the artillery corps, served during the war with Mexico, being brevetted captain and major, was assistant instructor of cavalry and artillery at West Point and, with Albert Sidney Johnston, took part in the Utah Expedition of 1857. When the Civil War broke out, he became brigadier-general of volunteers, a few months later he was assigned command of a division in the Army of the Potomac and he distinguished himself as one of McClellan's most valuable commanders in the Peninsula Campaign, being thereupon promoted major-general of volunteers. For his conduct at the second Battle of Bull Run, where he was inactive during the former, though of great service in the latter part of the engagement, he was court-martialed and dismissed. Finally, however, in 1886, Congress restored his rank of colonel and retired him at his own request. Colonel Porter, who was a cousin to Admiral David Dixon Porter, at one time declined command of the Egyptian army.

Porter, Gene Stratton (1868-), an American author and illustrator, born in Indiana. She uses the pen name Gene Stratton-Porter. In 1886 she was married to Charles D. Porter. She has served as editor of the camera department of *Recreation,* was on the staff of *Outing* and was for several years a specialist in natural history photography on the *Photographic Times Annual Almanac.* She is the author and illustrator of *The Song of the Cardinal, Freckles, A Girl of the Limberlost, At the Foot of the Rainbow, Birds of the Bible, Music of the Wild* and *The Harvester.*

Porter, Horace (1837-), an American diplomat and brigadier-general in the United States army, born in Huntingdon, Pa., and educated at Harvard University and the United States Military Academy. He has filled executive positions on several railroads. He served in the Civil War on General Grant's staff, received six brevets for gallantry in battle and the congressional medal of honor for his services at Chickamauga; and was the first American to receive the Grand Cross of the Legion of Honor of France. He has been assistant secretary of war, ambassador to France and delegate to the Peace Conference at The Hague. Union University in 1894 and Princeton in 1906 granted him the degree of LL. D. General Porter for several years sought and finally recovered the body of John Paul Jones, the first American admiral. For this service Congress in 1906 unanimously extended him a vote of thanks.

Porter, Jane (1776-1850), an English novelist, born at Durham. In 1779 the family removed to Edinburgh, where she enjoyed the companionship of young Walter Scott and Flora Macdonald and happily learned many of the stories of the border and fairy tales. Her first work, *Thaddeus of Warsaw,* appeared in 1803, was very popular and procured her election into the Teutonic Order of St. Joachim. Seven years later she published *Scottish Chiefs,* a story of the times of Bruce and Wallace, which in spite of its unconvincing sentimentality was the best historical romance before Scott. It was widely translated and revealed vivid and picturesque power of narration. She also wrote *Tales Round a Winter Hearth,*

The Pastor's Fireside, The Field of Forty Footsteps and *Sir Edward Seaward's Diary.*

Porter, Noah (1811-1892), an American educator, born at Farmington, Conn. Graduating at Yale in 1831, he remained as student of theology and tutor until 1835. Following pastorates in Congregational churches at New Milford, Conn., and Springfield, Mass., he was appointed professor of moral philosophy and metaphysics at Yale in 1846, and held this position until his death. For 15 years, beginning in 1871, he was president of Yale; and his administration was distinguished by the material progress of the institution, the broadening of the curriculum and the introduction of elective subjects. Dr. Porter ranks among the most eminent American metaphysicians of his time; and as a teacher he exerted a powerful and lasting influence upon his students. He wrote many scholarly articles, was editor-in-chief of two standard editions of *Webster's Dictionary* and published *Elements of Moral Science* and *The Human Intellect.*

Porter, Sydney (1867-1910), an American author, better known by his pen name, O. Henry. He was born in Greensboro, N. C., and educated in Texas. For a time he was on the staff of the Houston *Post,* then became publisher and editor of the Austin *Iconoclast,* later the *Rolling Stone.* This venture not proving successful, he removed to New York and began contributing to magazines and newspapers. His humorous and widely popular stories of New York life were faithful and sympathetic delineations of the poor in that city. His published works include *Cabbages and Kings, The Four Million, The Voice of the City, Options* and *Roads of Destiny.*

Port Gib'son, Battle of, an engagement of the Civil War, fought near Vicksburg, Miss., May 1, 1863. During Grant's campaign along the Mississippi River, he himself, with 25,000 Federals, was pursuing Pemberton towards Vicksburg, when his advance overtook the enemy's rear, 12,000 strong, near Port Gibson. The Confederates defended themselves stoutly, but they were so outnumbered that they were forced to retreat, which they did in good order.

Port Hud'son, Siege of, a siege of the Civil War, established by the Federals, under General Banks, aided by Farragut's fleet, against Port Hudson, La., near Baton Rouge, which was held by Confederates under General Gardner, March 26 to July 9, 1863. Farragut blockaded the Red River, cutting off supplies and thus establishing a close siege, during which Banks made several unsuccessful assaults. At length news of the fall of Vicksburg was received, whereupon Gardner surrendered. The entire Mississippi was then in possession of the Federals.

Port Hu'ron, Mich., a city and the county seat of St. Clair Co., and the port of entry of the Huron customs district, 60 m. n.e. of Detroit and 109 m. n.e. of Lansing, on Lake Huron at the head of the St. Clair River, which connects lakes Huron and Erie. The Pere Marquette, Grand Trunk and other railroads enter the city, and steamboats ply between this and other lake ports. A railway tunnel under the river connects with Sarnia, Ontario. Port Huron has extensive shipping interests and carries on a large foreign trade, chiefly with Canada, its annual exports amounting to approximately $20,000,000. In addition to several shipyards and dry docks, the city contains car shops, boiler factories, engine and thrasher works, foundries and manufactories of automobiles, agricultural machinery, paper, pulp and toys.

Owing to its fine location, mineral water, delightful climate and other attractions, Port Huron is a popular summer resort. Among its conspicuous features are a public hospital and public parks. There are numerous handsome buildings, including a Federal Government Building, city hall, county courthouse, several business structures and two temples of the Knights of the Maccabees, a secret fraternity, which has headquarters here. The earliest permanent settlement on the site of Port Huron was made by the French in 1790. The place was laid out

in 1835 and five years later incorporated; it was chartered in 1857. The town has been successively known as La Rivière De Lude and Desmond. Population in 1920, U. S. Census, 25,944.

Port Jer'vis, N. Y., a city of Orange Co., 88 m. n.w. of New York City, on the New York, Ontario & Western and the Erie railroads. It is situated at a junction of the boundary line of New York, New Jersey and Pennsylvania, named "Tri States," and on the Delaware River at the mouth of the Neversink. Port Jervis is of considerable importance as a railway station for a large territory frequented as a summer resort. St. Mary's Orphan Asylum is located here. Among the industrial plants are the Erie railroad shops, silver-plating works, cut-glass shops and shoe, saw, glove, underwear and silk factories. Population in 1920, U. S. Census, 10,171.

Port'land, Me., port of entry, commercial metropolis of the state and county seat of Cumberland Co., 108 m. n.e. of Boston, on Casco Bay and on the Maine Central, the Grand Trunk, the Boston & Maine and other railroads. It has direct steamship connections with Boston, New York and other Atlantic coast ports, and is the terminus of several trans-Atlantic lines. The government defense works, which have been recently enlarged, include Ft. Preble, Ft. Williams on Portland Head, Ft. Levett on Cushing's Island and Ft. McKinley on Great Diamond Island, making Portland the third strongest fortified port in the United States. Portland possesses a site of great natural beauty, and is situated on a peninsula extending into Casco Bay, which rises on each extremity into elevations, giving the city a fine appearance from the sea. The harbor, with its marine railway and extensive wharves, is one of the finest on the Atlantic coast and has a depth of water sufficient for the largest ships.

Portland has an area of 18 sq. m. It is handsomely built, and the streets are lined with trees, which has given it the name of "Forest City." In the vicinity are numerous resorts and watering places, making it one of the celebrated pleasure resorts of the East. There is an extensive park system, which embraces the eastern and western promenades, Ft. Sumner, Ft. Allen, Lincoln and Deering's Oaks parks, Monument and Boothby squares. The historic observatory on Munjoy's Hill commands a superb view of the city and its surrounding waters.

Among the public and educational institutions are the Maine Medical School, affiliated with Bowdoin College, St. Joseph's Academy for Girls, Maine School for the Deaf, Home for Aged Women, St. Elizabeth's Academy, the Maine Eye and Ear Infirmary, Children's Hospital, Home for Aged Men, United States Marine Hospital, Female Orphan Asylum, the Maine General Hospital, the Portland Public Library, the Portland Society of Natural History and Portland Society of Art. The noted colonial mansions include the Longfellow house and the Deering and Clapp mansions. The Maine Historical Society is located in the rear of the Longfellow house, both of which are visited by thousands of tourists annually. Other important buildings are the New City Building and Auditorium, possessing a $60,000 pipe organ; County and Federal Court buildings; and Williston Church, where was created the Young People's Society of Christian Endeavor.

Portland has an extensive foreign trade, as well as coastwise trade, and controls large fleets engaged in cod, mackerel and herring fisheries. It also has packing and canning industries and is engaged in the refining of petroleum. Shipbuilding is largely carried on. There are manufactories of engines, elevators, heavy iron forgings, furniture, show cases, printers' machinery, boots and shoes, woolen goods, window screens, silverware, paper, pulp, sewer pipe, marine hardware, flavoring extracts, cordage, art glass, mill stones, stoves, coffee and spice, tents and awnings, mattresses, leather, soap, candles and creamery products. Portland also possesses large cold-storage warehouses.

The first settlement was made by the English in 1633. It was first known as Casco Neck, later becoming the town of Falmouth. The name was changed to Portland in 1786. The poet Longfellow, N. P. Willis, Commodore Preble, Neal Dow and Thomas B. Reed were natives of Portland. Bronze statues of Longfellow and Reed are features of the city. Portland was nearly destroyed by fire in 1775 and again in 1866. It received a city charter in 1832. Population in 1920, U. S. Census, 69,272.

Portland, Ore., a city and county seat of Multnomah Co., on the Willamette River, 12 m. from its confluence with the Columbia River, 100 m. from the Pacific Ocean, 186 m. s.w. of Seattle (Wash.) and 772 m. n. of San Francisco, on the Union Pacific, the Southern Pacific, the Northern Pacific, the Great Northern and the Canadian Pacific railroad systems and their branches. The city is also the terminus of the Pacific Steamship Company's Oriental and Coastwise service, San Francisco and Portland Steamship Company, Parr-McCormick Steamship Company and others. A large volume of the shipping is handled by what are known as "tramp" vessels. The Dalles-Celilo Canal has been constructed by the Federal Government, at a cost of over $4,000,000. This canal opens the Columbia and Snake rivers to Lewiston, Idaho, a distance of 500 m. The city is built on both sides of the river, which is crossed by five steel bridges, and has an area of 66 sq. m. There is a fine harbor. The source of the water supply is a lake 3500 ft. above the level of the sea at the base of Mt. Hood. Aside from the wonders of the natural scenery, which include the snow-clad summits of Mt. Ranier, Mt. Hood, Mt. Jefferson, Mt. St. Helen's and Mt. Adams, are the commercial activities of the city, which include miles of wharves, grain elevators, flour and lumber mills; some of the lumber mills are among the greatest in the world. The street-railway system operates about 250 m. of track with adequate modern service.

Parks and Boulevards. Portland is one of the attractive cities of the country and contains about 400 m. of shaded and paved streets. As a background the city has eminences known as Portland Heights, King's Hill and Willamette Heights, dotted with beautiful residences and surrounded by lawns and semitropical flowers. Portland is known as the "Rose City." Competitive exhibits of roses are held at the carnival of roses in June of each year. There are numerous beautiful drives and about 205 acres in parks. The Oaks is known as Portland's Coney Island. The famous statue *The Coming of the White Man* is located in the City Park. There is also a fine monument to the Oregon volunteers of the Spanish War in the Courthouse Square.

Public Buildings. Among the noteworthy buildings are the custom-house, city hall, Union Station, Federal Building, armory, Railway Exchange, Forestry Building, which is a memorial of the Lewis and Clark Exposition, the Chamber of Commerce, the Municipal Auditorium, the Y. M. C. A., the Y. W. C. A., the Corbett, Wilcox, Pittsch, Spalding, Sherlock, Henry, Yeon and Selling buildings, a public library, art museum, substantial business blocks, well-equipped hotels, which include the Multnomah, the New Perkins, the Benson, Imperial, Oregon, Mallory, the Portland, the Seward, the Lenox, the St. Charles, the Nortonia and the Cornelius, and a number of banks and theaters. Portland has about 150 churches representing pratically all denominations, and many have large and handsome edifices.

Institutions. In educational matters Portland ranks high. Reed College, a new collegiate institution for higher education, with an endowment of $3,000,000, was opened in 1912. Other institutions include the Hill Military School, St. Helen's Hall for girls, Columbia University (Catholic) for young men, College of Dentistry and Pharmacy, a number of business colleges, schools of music, School of Commerce, Public School of Trades, five high schools and public and parish schools. Here, too, are the law and medical departments of the University of

Oregon. Among the benevolent and charitable institutions are about 30 public and private hospitals, asylums and homes for the aged and for children.

INDUSTRIES. Portland is the principal manufacturing city of the state, and the lumber industry is a leading one. The output of its lumber mills is shipped to all parts of the United States as well as foreign ports. The city is the fourth largest agricultural-implement center in the country, and the implement houses represent a capital of $200,000,000. The principal manufactures include flour and gristmill products. There are also manufactories of engines, boilers, furniture, paper bags, woolen goods, saddlery and harness, paints, cordage, spices and other diversified products. Wheat, flour, dried fruit, wool, hops and salmon are among the exports. The country surrounding Portland is rich in timber and minerals, which include gold, silver, copper, platinum, asbestos, borax and coal, and a vast agricultural, stock-raising and fruit-growing section is tributary to the city. Shipbuilding is an important industry. The city contains large stockyards, a slaughtering and meat-packing plant and shipyards. One of the largest electrical-transmission plants in the world is located here and is used for lighting, for street and interurban railroad lines and for commercial power.

HISTORY. The first settlement was made in 1845 by New England real estate men, and named after Portland, Me. The town had a rapid growth and in 1851 it was chartered as a city. A disastrous fire occurred here in 1873. Eastern railway communication was established by the Northern Pacific Railroad in 1883. In July, 1891, Albina and East Portland were annexed to the city. In commemoration of the Lewis and Clark Expedition of 1805, a Centennial and American-Pacific Exposition was held here in 1905. Population in 1920, 258,288.

Port Natal, *Na tahl'*. See DURBAN.

Porto Rico, *Pore' to Re' ko,* one of the larger islands of the West Indies, lies between 17° 50′ and 18° 30′ north latitude and 65° 30′ and 67° 15′ west longitude. It is approximately the same distance from the equator as Hawaii and northern Luzon, and has the same longitude as the southern part of Nova Scotia. Porto Rico is 1400 m. s.e. of New York, 70 m. e. of Santo Domingo, 1000 m. from Key West and 1500 m. from New Orleans.

SIZE. The island is approximately rectangular in outline, about 40 m. wide at the west end and 100 m. in length from

PORTO RICO

east to west. It controls Mona Island, known for its great deposits of guano; Culebra, with its important United States naval station; and Vieques, where many of the people formerly spoke French more commonly than Spanish, but, like all Porto Ricans, are now beginning to speak English with some fluency. It has a total area of 3606 sq. m., the equivalent of 100 regular townships. This is about three times the area of the State of Rhode Island, or three-fourths that of Connecticut.

Population. In 1920 Porto Rico had a population of 1,299,809, in this respect ranking above 18 of the states and exceeding the combined population of Vermont, Idaho, Delaware, Wyoming and Nevada (1,279,059). Its population is more than double that of New Mexico and Delaware combined (583,250). Between 1910 and 1920 there was a gain in population of 181,797, or 9.3 per cent. This gave Porto Rico 360 inhabitants to the square mile, a density of population seven times that of Cuba, and exceeded, under the American flag, only by New Jersey (383.4), Massachusetts (466) and Rhode Island (484.2).

Surface. The island is mountainous, the principal range, which extends from west to east, having several peaks approximately 3000 ft. high and culminating in El Yunque, near the northeast corner. This peak rises 3750 ft. above the sea, and is shrouded in mist save now and then for brief intervals. About one-tenth of the total area is included in the level or slightly rolling coastal plain, from which rich valleys extend into the interior. Because of its beautiful scenery, Ex-President Roosevelt has called Porto Rico the "Switzerland of America." The rivers are numerous, but short; and, though not navigable, are being utilized with great advantage for the development of electric power. The most important streams are the Bayamon, Loiza, La Plata, Manati, Arecibo and Blanco. Porto Rico has few lakes; but along the north coast there is a series of lagoons which are of considerable importance as waterways.

Climate. Being within the region of the northeast trade winds, and surrounded by so great an expanse of water, Porto Rico enjoys a most delightful climate, with a mean annual temperature of about 76°. The maximum seldom reaches 100° in the summer, or falls below 50° in the winter. The average rainfall is 77.30 inches. On the sides of El Yunque it is 135 inches. Extensive irrigation works have been constructed for the benefit of an arid region along the south coast.

Minerals and Mining. The mineral resources of Porto Rico are believed to be limited. Deposits of magnetic iron ore have been considered of no great value. Marble, quarried near Juana Diaz, is used only for building purposes. Gypsum, phosphates, guano, limestone of excellent quality and clay suitable for brickmaking are found in considerable quantities. There are also productive salt deposits.

Forests and Lumber. The mountains of Porto Rico are covered with verdure, save on portions of the south slope. But in many instances these are found to be coffee plantations, with trees planted here and there to shield the growing coffee, just as cheesecloth is used to protect the best tobacco fields and insure a finer leaf. Timber sufficient for local needs and for fuel is, therefore, almost everywhere available; but lumbering can hardly be included among the industries of the island.

Agriculture. This is the principal occupation of the people; and about seven-eighths of the exports are the raw products of agriculture, while practically all of the remainder consist of cigars and cigarettes made from Porto Rican tobacco.

Soil. Much of the coastal plain is a sandy loam or a rich alluvium, which changes to a clay loam on the slopes of the foothills; while the mountains are covered, for the most part, to their very summits with a clay soil rich in plant food.

Products. In Porto Rico, sugar is king, the value of the annual output (of more than 500,000 tons) representing

three-fifths of the total exports. In quantity, this is approximately equal to the production of Louisiana, and is two-thirds as much as the total beet-sugar production of the entire United States. Sugar cane is grown on the alluvial soils near the coast, a large proportion of which are now devoted entirely to this crop.

Tobacco is the island's second great staple. Although everywhere grown for local use, important tobacco districts have been developed in the mountain valleys of the north slope, perhaps 15 m. from the sea, where the richness of an already fertile soil is sustained in part by the wash from surrounding mountains. Here the tobacco is grown under cheesecloth, and is of the finest quality. The exports amount to $7,000,000 per annum, of which more than $5,000,000 represent cigars and cigarettes.

Coffee is known as the poor man's crop, because it is grown successfully by thousands of individuals, while the production of sugar and tobacco by modern methods requires investments so great that only giant corporations can finance them. With the introduction of scientific methods and the development of an American market, the production should easily be doubled. In 1910 the exports of coffee exceeded $5,600,000.

Tropical fruits, including the orange, grapefruit, banana and pineapple, are produced in large quantities, but principally by American individuals or companies. The best stock, scientific methods and hard work are rapidly winning for this industry a place which it never before held in Porto Rico. Coconuts, which have always been an important source of wealth, are grown upon the poorest sandy lands, usually within a mile or two of the sea. Returns from investments in coconut plantations anywhere in the tropics are usually greater than from either sugar or tobacco, and this is true also in Porto Rico. The value of all fruits and nuts exported is about two-fifths of the value of the coffee exported, two-sevenths that of the tobacco and one-twelfth that of the sugar.

MANUFACTURES. These include (a) the manufacture of about $25,000,000 worth of sugar, refined in the United States; (b) of the approximately $5,000,000 worth of high-grade cigars and cigarettes; and (c) many small industries, which are, for the most part, of local importance.

COMMERCE AND TRANSPORTATION. Transportation facilities do not yet adequately meet the needs of the people, but are being rapidly improved. The Spanish Government had constructed 275 kilometers of magnificent roads prior to 1898. About 1000 kilometers have been constructed since American occupation; while bridges have been put in at many dangerous fords. Owing to the mountainous character of the country and the heavy rainfall, the annual cost for maintenance of roads averages $305 per kilometer, or five-eighths of a mile.

The Insular Telegraph System reaches 60 municipalities out of 66, and connects all the important towns, while telephone service is maintained in numerous places. Electric cars connect Ponce with its harbor, and give excellent service throughout the city. An electric line is operated between San Juan and Rio Piedras, the university town. Power for this road and for lighting these cities is developed at Comerio Falls. A steam road connects Rio Piedras with Caguas, the most important tobacco center, while the American Railroad gives regular service from Carolina through San Juan, Mayaguez and Ponce to Guayama, and will doubtless belt the island within a brief period. An excellent harbor is being developed at San Juan.

In 1901 the total exports of Porto Rico were somewhat less than $9,000,000; in 1919 they were $71,015,351; and nearly all of them were to the United States. Her imports, which were less than $9,000,000 in 1901, reached $57,898,085 in 1919, and practically all of them came from the United States. This gave Porto Rico 13th place among the purchasers of American goods in the various mainland markets of the United States.

PORTO RICO

EDUCATION. During Spanish times, education was neglected and a very large proportion of the people could neither read nor write. In 1898 some 18,000 pupils were receiving instruction at the homes of teachers licensed by the government, but paid by the parents of those who attended. Since American occupation, the people of the United States have given Porto Rico all customs duties and all excise taxes collected in the island, a total of approximately $30,000,000. Of this some $12,000,000 has been expended for education; and today there are not less than 60,000 pupils in regular attendance upon the rural schools, while 40,000 attend the graded schools of the towns and cities. Each year about 1000 complete the work of the eighth grade; and some 1200 are now attending the various high schools. The University of Porto Rico enrolls about 250 students, and double that number at its summer session. It receives the same Federal appropriations as the land grant colleges of the United States, and maintains a strong normal department, a college of agriculture, with a model dairy and other important adjuncts, and a college of liberal arts established in 1910.

GOVERNMENT. From Oct. 18, 1898, to May 1, 1900, Porto Rico was under a military government. Civil government established under the Foraker law of that year was directed by the bureau of insular affairs of the war department at Washington, D. C. A modified form of local self government existed throughout the land, the President of the U. S. appointed the governor and the eleven members of the upper House while the people chose the 35 members of the lower legislative assembly. Under the organic act of March 2, 1917, the legislative power in Porto Rico is vested in a legislature consisting of two houses, one the senate and the other the house of representatives. The senate consists of nineteen members elected for terms of four years by the qualified electors of Porto Rico. The house of representatives consists of thirty-nine members elected for a term of four years by the qualified electors of Porto Rico. The members of the senate and house of representatives receive compensation at the rate of $7 per day for ninety days of each session and $1 per day for each additional day of such session while in session. Regular sessions of the legislature are held biennially, convening on the second Monday in February.

PUBLIC INSTITUTIONS. Porto Rico maintains the usual charitable, penal and correctional institutions. These include an asylum for the insane at San Juan, the Boys' Charity School and the Girls' Charity School in Santurce, San Juan's residential suburb, and various other institutions. The United States Agricultural Experiment Station at Mayaguez has rendered important service, especially to the horticultural interests, and is making a prolonged and intensive study of the coffee industry. The Insular Library in San Juan reports some 15,000 volumes and approximately 2000 persons holding library cards. It maintains a free reading room, open morning, afternoon and evening. The Insular Fair Board, created in 1910, held the first insular fair in 1911; and the many exhibits from the United States and from local exhibitors gave a new impulse to all industry. Among the important semipublic institutions are the Presbyterian Hospital of Santurce, and St. Luke's Hospital, maintained by the Episcopal Church at Ponce.

CITIES. San Juan, the capital; Ponce, the metropolis of the southern coast; Mayaguez, perhaps the most attractive city to tourists; Arecibo, Fajardo, Humacao, Caguas and Guayama are the most important cities. Each of the first two reports upwards of 50,000 people, and all are developing rapidly.

HISTORY. On Nov. 19, 1493, Christopher Columbus, accompanied by Juan Ponce de Leon and others, and then on his second great voyage, landed near Aguadilla. The Indians called the island Borinquen. He named it San Juan Bautista. The *Columbus Spring* at Aguadilla, the cross which marks the spot where Columbus landed, and the Columbus monument in San Juan are of spe-

cial interest to tourists. In 1508, Ponce de Leon explored much of the island and, after making the settlement of Caparra, or Pueblo Viejo, near the present city of San Juan, was made governor. This was the same Ponce de Leon who discovered Florida on Easter Sunday in 1513, after Diego Columbus, son of Christopher, had sent a new governor to Porto Rico. During that celebration of four centuries of organized government, held in San Juan in 1908, the remains of Ponce de Leon were removed with much ceremony, from the church where they had long reposed, and deposited in the Cathedral. Pueblo Viejo is now surrounded by the cheerful homes of many American settlers, who, amid their extensive groves of orange and grapefruit trees, maintain the same literary and social life, and follow the same scientific business methods found elsewhere under the American flag.

In general, Porto Rico had suffered much as Cuba had, during the 390 years of Spanish rule. Her needs were not understood in Spain, and those who administered the government of Church and State in the island too often sought only to acquire such wealth as would permit their retirement to a life of ease in the home country. In 1511, approximately one-half of the Spanish settlers were killed by the Indians because more than 1000 of their people had been distributed as laborers under cruel masters. These having suffered defeat, 4000 more Indians were immediately distributed as slaves. Thus the Indian was gradually eliminated. As early as 1530 some 1500 negro slaves had been procured at extravagant prices to perform the heavier physical labor of the fields. This traffic came to an end in 1820; and slavery was finally abolished in 1873. The whites always greatly outnumbered the blacks.

During the Spanish-American War American forces under Gen. Nelson A. Miles were landed at Guánica on July 25, 1898, by Admiral Sampson's fleet; and, at the conclusion of the war, the island, which had welcomed our forces, became a possession of the United States.

Port Said, *Sah eed',* a seaport of Egypt at the northern entrance of the Suez Canal, 145 m. n.e. of Cairo. The site is a low, desolate point of land which separates the Mediterranean from Lake Menzala. There is a large harbor, and the city is an important coaling station for ships passing through the canal. It is the chief port for the export of cotton raised on the Nile delta, and has considerable traffic in imports and other exports of Egypt. Population in 1911, 49,884.

Portsmouth, *Ports' muth,* a seaport and naval station of England, situated on the southwestern short of Portsea Island, 74 m. s.w. of London. The fortifications are among the most complete in England, and the large, deep harbor is adequately protected by a breakwater and piers. The total area of the dockyard is 293 acres, and the spacious dry docks admit the largest vessels. Portsmouth has had commercial importance since the time of Henry VIII, and considerable traffic in coal, cattle, agricultural products and timber is carried on. It is the birthplace of Charles Dickens and George Meredith. Population in 1911, 231,165.

Portsmouth, N. H., a city, port of entry and one of the county seats of Rockingham Co., 58 m. n.e. of Boston, on the Piscataqua River, 3 m. from the Atlantic Ocean, and on the Boston & Maine Railroad. It was the capital of the state until 1807 and is now alternately with Concord the seat of the sessions of the United States District Court of New Hampshire. Portsmouth is the only seaport in the state and is situated on a peninsula overlooking the harbor, which is deep, commodious and easily accessible. The harbor is protected by earthworks at Jaffrey's Point and Gerrish's Island. The city is closely connected with the popular resorts of York Beach and Hampton Beach, and in the summer has daily steamboat connection with the Isles of Shoals. Portsmouth itself is a well-known resort, attractive for its fine situation and for the historic interest of its edifices.

The city is the center of an important trade both foreign and coastwise. The chief industrial establishments include boot and shoe factories, paper mills, iron forgings, shoe-heel factories, marble and granite works and button factories. The chief object of interest is the Kittery United States navy yard on Continental (or Fernald's) Island near the east side of the river and connected by bridge with Kittery, Me. It contains three immense ship houses and a large floating balance dock. The famous vessels, *Ranger* and *Kearsarge*, were constructed here. In 1898 the Spanish prisoners from Cervera's fleet were brought here and given quarters on a small island connected with the navy yard island (See SPANISH-AMERICAN WAR). Portsmouth is the birthplace of Thomas Bailey Aldrich, story-writer and poet. The treaty of peace between Russia and Japan was signed here on Sept. 5, 1905. Portsmouth was incorporated as a town in 1653 and chartered as a city in 1849. Population in 1920, 13,569.

Portsmouth, Ohio, a city and county seat of Scioto Co., 95 m. s. of Columbus and 100 m. s.e. of Cincinnati, on the Ohio River, near the mouth of the Scioto, at the southern terminus of the Ohio Canal and on the Chesapeake & Ohio, the Baltimore & Ohio Southwestern and the Norfolk & Western railroads. It has steamboat connection with all the Ohio River ports. It is noted as a city of homes and is surrounded by beautiful scenery. The city is situated in a productive agricultural and fruit-growing region with considerable mineral wealth, and is an important industrial and commercial center. The chief manufacturing industries are represented by rolling mills, iron foundries, steel-works, furniture and veneer works, a distilling and rectifying plant, shoe factories, stove and range works, hub and spoke works, paper-box factories, car shops, a fire-brick plant and lumber mills. There are many fine public buildings, a hospital, orphanages and an old ladies' home. The Hamilton Peebles Reading Room is located here. The Valley of the Scioto is famous among archæologists for many remains of the mound builders. Portsmouth was settled in 1803 and incorporated in 1814. Population in 1920, U. S. Census, 33,011.

Portsmouth, Va., a city of Norfolk Co., on the Elizabeth River opposite the city of Norfolk, and on the Norfolk & Western, the Chesapeake & Ohio, the Atlantic Coast Line, the Southern, the Seaboard Air Line, the New York, Philadelphia & Norfolk and other railroads. The city has lines of steamers to Washington, Baltimore, Providence, Boston, New York and other Atlantic coast ports. The Portsmouth Belt Line Railroad connects the railroad systems, besides other subsidiary lines, with points in North Carolina and Chesapeake Bay region. The city has over two miles of water front and adjoins a rich agricultural and market-garden region. The Elizabeth River at this point is nearly a mile wide, and ferryboats connect the city with Norfolk. The Norfolk Yard, a United States navy yard and station of 450 acres, the second largest in the country, is located in the southern part of the city. The Norfolk Yard is also the distribution headquarters of the United States marine corps. Together Portsmouth and Norfolk form a customs district.

The famous oyster beds, known as the Virginia oyster fisheries, are located in the vicinity, and oysters are shipped to all points in great quantities and form an important source of revenue. The city has direct communication with the great coal fields of Virginia and West Virginia. Among the noteworthy buildings are a courthouse, commercial building, city hall, post office, high school, an orphan asylum, King's Daughters' Hospital, United States Naval Hospital and the Old Trinity Church, built in 1762. A fine public park is located in the northern part of the city. There are a number of handsome residential districts, and many business men of Norfolk have their homes in Portsmouth. The manufacturing establishments include railroad shops, naval stores, cotton mills, found-

ries, machine snops and manufactories of lumber and cotton products. The ironclad *Merrimac,* which fought the famous engagement with the *Monitor* in Hampton Roads on March 9, 1862, was constructed here. Population in 1920, U. S. Census, 54,387.

Por'tugal, a country of Europe, occupying the western part of the Iberian, or Pyrenean, Peninsula. It lies between 37° and 42° north latitude and between 6° 15′ and 9° 30′ west longitude, and is bounded on the n. and e. by Spain and on the s. and w. by the Atlantic Ocean. Including the Azores and the Madeira Islands the total area of the kingdom is 35,582 sq. m., a little more than that of Indiana.

Surface, Rivers and Lakes. The interior is mountainous and is occupied principally by the three mountain systems, the Serra do Gerez, an extension of the Pyrenean, the Serra da Estrella and the Serra de São Mamede. North of the Tagus River the country is generally elevated, and beautiful and fertile valleys spread between imposing mountain chains. Southern Portugal consists of plains, sandy coastal regions and hills, and rarely rises above the surrounding plateau. The principal rivers rise in Spain and include the Tagus, Guadiana, Minho and Douro. The Tagus has, at Lisbon, one of the finest harbors in the world. The Minho Valley is fertile and the salmon and lamprey fisheries of the river are significant. The rivers are not as yet used much for navigation.

Climate. The climate is generally temperate and oceanic. The region south of the Tagus is affected by the hot winds from Africa, and then the sandy, treeless plains grow very parched and thirsty. During seasons of rainfall the precipitation is very abundant; Coimbra, halfway between Lisbon and Oporto, sometimes has an annual precipitation of 192 inches and is known as the rainiest place in Europe. In September, after the close of the summer drought, a second spring unfolds, and cold weather does not set in until the end of November.

Mining and Agriculture. The mining industry is in a far from prosperous condition; for many of the rich mines lie idle or are in the hands of foreigners. Among the principal abundant mineral resources are lead, tin, zinc, manganese ore and antimony. Salt, chiefly sea salt, is produced in large quantities and is considered the best in Europe. The climate of the country is favorable for the production of any kind of crops common to southern and central Europe, but agriculture remains in a low state of development, and the methods and implements in use are very primitive. Maize is cultivated north of the Tagus River; wheat and rye are grown in the southern and eastern parts. Citrus fruits, olives and flax are grown. Portugal is one of the leading wine countries in the quality of its productions, and Poceirao, comprising 5930 acres, is the largest vineyard in the world. It yields annually about 2,650,000 gallons of red and white wine. Live-stock raising is an important industry, and the culture of the silk worm has rapidly increased within recent years.

Manufactures, Transportation and Commerce. The manufactures of Oporto and Lisbon have developed far in advance of those of the rest of the country. The principal products manufactured in Portugal are cotton, silk and linen goods, leather, hats, ironware, porcelain, shoes, soap and brandy. Within recent years shipbuilding has increased in importance. The rivers that enter from Spain are navigable near the border and are used extensively for the transportation of commodities. The wagon roads have been improved and the railroad lines have a mileage of approximately 1500. The harbors are good and about 3900 vessels are engaged in the active coasting trade. The ports, principally Lisbon and Oporto, are way stations for steamers of numerous lines that ply to western Africa, the Mediterranean, eastern Asia and South America. The imports consist of fish, raw cotton, coal and manufactured articles. The exports include copper ore, fruit, wine, cork, olive oil and live stock.

PORTUGAL

INHABITANTS. During the four centuries when Portugal was engaged in the slave trade a large number of African and Brazilian negroes were transported into the country, and the population now consists to a large extent of the descendants of the native inhabitants who intermarried with these foreigners. The native type is short of stature and possesses invariably a dark complexion with dark hair and eyes. The density of population is 152.8 to the square mile; the urban population is not large. Emigration, principally to the United States and Brazil, numbers about 20,000 annually. There is but slight difference between the Portuguese language and the Spanish.

GOVERNMENT AND RELIGION. The Republic of Portugal was proclaimed Oct. 5, 1910, upon the abolition of the constitutional hereditary monarchy. A president acts as chief executive, and is elected by Congress to serve a term of four years. The Congress consists of a Chamber of Deputies and a Senate. The Chamber of Deputies is composed of 164 members elected for three years by direct suffrage. The members of the Senate, 71 in number, are elected for six years.

The Roman Catholic Church is the leading church, but all religions are tolerated. The Church Separation Law, promulgated in 1911, provided that Roman Catholicism should cease to be the religion of the State. At this time State expenditure for worship ceased. There is observed, between sunrise and sunset, free public observance of all creeds.

LITERATURE. See LITERATURE, subhead *Portuguese Literature*.

EDUCATION. Primary education is free, but the compulsory-education law is not enforced, and the country remains backward in educational matters. About 75.1 per cent of the population represents the illiteracy of the country. There are secondary schools in the principal towns of every district. Technical, commercial and industrial schools are maintained. The University of Coimbra was founded in 1290.

COLONIES AND CITIES. The Portuguese colonies include both African and Asiatic possessions. The African embrace Cape Verde Islands (1476 sq. m.), Guinea (13,088 sq. m.), Prince's and St. Thomas' islands (363 sq. m.), Angola (490,463 sq. m.) and East Africa (293,860 sq. m.). The possessions in Asia are Goa, in India (1163 sq. m.), Damão and Diu (150 sq. m.), Indian Archipelago (6273 sq. m.) and Macao, in China (4 sq. m.). The principal cities are Lisbon (the capital), Oporto, Braga, Setubal, Funchal and Coimbra.

HISTORY. At an early date the Greeks, Phœnicians and Carthaginians traded in what is now Portugal, the original name of which was Lusitania. The Romans began the conquest of the country in 189 B. C., and were followed in the fifth century by the Visigoths. The Saracens conquered the country in the eighth century, but in 997 the territory between the Douro and the Minho was taken from them by the King of Galicia, a kingdom of Spain. The reconquest of the country by the Spaniards was completed as far south as Coimbra by King Ferdinand of Castile and Leon, the reconquered districts being organized into counties, feudal dependencies of Galicia. The new nation took its name from the northern county, *Comitatus Portucalensis*. See SPAIN, subhead *History*.

Ferdinand's realm was divided, but the eldest son, Alfonso VI of Leon, forcibly united all the family possessions in 1073. In 1095 Count Henry of Burgundy, son-in-law of Alfonso, received Coimbra and Oporto, with the title of Count of Portugal. In 1128 Henry's son Alfonso took control of the government, and after fighting bravely to uphold his authority, assumed the kingly title as Alfonso I. In 1147 he took Lisbon from the Moors and made it his capital. His long and brilliant reign ended in 1185. Under Alfonso III (1248-1279), the country reached its greatest European expansion. The reign of Diniz (1279-1325), son of Alfonso III, was a period of progress, and the foundation of Portugal's future greatness was

laid. Diniz founded agricultural schools, introduced better methods of agriculture, encouraged trade by forming a royal navy, and strove to bring the feudal courts under royal power. He was a poet, and encouraged education, art and literature, founding, in 1290, the University of Lisbon (now Coimbra).

During the reigns of Alfonso IV and Pedro I the nation continued to advance in wealth and culture, but after Pedro's death in 1367 a period of anarchy followed until the nation chose John I (1385-1433) as king. John's long reign of nearly half a century was made famous by his strong and intelligent administration of the government, and by the explorations of his brilliant son, Prince Henry the Navigator, who used vast sums of money for this purpose and had the best maps and the finest instruments. In 1419 the Portuguese rediscovered Madeira, and at the close of John's reign they reached the Azores. In 1445 they reached the Senegal and Cape Verde, and had gone nearly as far as Sierra Leone the next year. Commerce and colonies followed their explorations. Under John II (1481-1495) Diaz doubled the Cape of Good Hope in 1488. Also in this reign Pope Alexander VI issued his famous bull (May 4, 1493), defining the limits of the discoveries of Spain and Portugal. In 1497-1499 Vasco da Gama completed his voyage to India, greatly enhancing the prestige of Portugal.

Meanwhile the nobles, who had received great power under John I, began rebelling against royal authority, and a period of misrule began during the minority of Alfonso V (1438-1481), which continued until John II made sure the authority of the monarchy, after the execution of 80 nobles. He was followed by Emanuel I in 1495. From 1499 to 1580 Portugal founded her empire under the double spur of commerce and missionary zeal. The Portuguese explored even to Greenland, and three Portuguese traders accidentally discovered Japan in 1542. Cabral had reached Brazil in 1500, while a ship of Magellan, a Portuguese in Spanish service, had completed the circumnavigation of the world in 1522. The wealth which came to the country laid the basis for an intellectual life which flowered in literature and art.

Certain weaknesses, however, aided in the decline of the nation. The empire was widely scattered and poorly organized; the finances were not fairly administered; the Portuguese engaged in the slave trade; the Jews were expelled and the population decreased; added to these evils were the domination of the Church in State affairs and the weakening of the king's power. From 1581 to 1640 Portugal was a dependency of Spain, but in the latter year a revolt restored national independence, and placed John IV, Duke of Braganza, on the throne. During the next two centuries affairs were in a turbulent state. The country was occupied by a French force while the Napoleonic wars were in progress, and the royal family fled to Brazil. In 1808 the Duke of Wellington entered Portugal, and after a series of campaigns finally forced the French to retire in 1811. In 1822 Brazil revolted and established an independent government (See BRAZIL, subhead *History*). In 1826 a new constitution was granted, and from this modern Portuguese history may be said to date. Between 1828 and 1842 the country suffered from the strife between the parties representing respectively the constitutional and the absolute monarchy, but the constitutional party finally prevailed.

In 1855 Pedro V assumed the government and was followed by his brother, Luiz. Luiz was succeeded by Carlos I in 1889. Carlos and the Crown Prince were assassinated Feb. 1, 1908, and Prince Manuel became king as Emanuel II. In 1910 a successful revolt led by Republicans in Lisbon overthrew the monarchy and established a republic with Dr. Theophilo Braga as temporary president. The provisional government under Dr. Braga remained in power until August, 1911, and accomplished three principal achievements: the maintenance of the republic, the dises-

tablishment of the Church and the organization of a means to create a new constitution. On Aug. 24, 1911, Dr. Manoel Arriaga was elected first president under the new constitution. The republic has been formally recognized by the leading nations of the world. Population 5,957,985.

Portuguese, *Por' tu gees,* **East Africa,** or **Mozambique,** *Mo" zam beek',* a Portuguese colony of Africa on the Mozambique Channel, lying between German East Africa on the n. and the British possessions on the w. and s. The coast is flat and swampy, but inland there is a high plateau, bounded by some mountain ranges of moderate elevation. The mountains are forest-covered and the plateaus are made use of for the production of maize, indigo, cotton, coffee, tobacco and sugar. Rubber, ivory, gums, wax and palm oil are also exported. The Limpopo and Zambesi rivers cross the country. The natives are chiefly Bantus, a people of the Negro race. Mozambique, Sofala, Quilimane, Ibo, Beira and Lourenço Marquez are the chief ports, and the last named is also the capital. Population, 3,120,000.

Por"tula'ca, or Purs'lane, a fleshy, leafy herb of the Purslane Family. One species is a common garden weed which thrives on light, sandy soil and is known to the farmer as pusley. The yellow-petaled flowers open only once and then for but a short time in the early sunshine. Other species which are cultivated for ornament have the same spreading, fleshy leaves and stems, but larger, showy pink, purple or crimson flowers. Portulaca is common as a weed or in cultivation in the United States, South America and Persia. The wild varieties are often used as greens.

Port Wine, a product obtained from grapes and made originally in the Douro Valley of Portugal and named from Oporto, whence it is generally exported. Its color varies from pink to dark red, and it is slightly astringent in taste. Many imitations of port wine exist. The port wines of California were good substitutes for the original. See WINE.

Pos'itivism (from Latin *positus,* that which is laid down, certain), in philosophy, applied to any system which confines itself to the data of experience to the exclusion of *a priori* speculations. The term may therefore be applied to empirical philosophy in general. In particular, however, it was used by Auguste Comte to characterize his system, which was based exclusively on the physical, or *positive,* sciences. See COMTE, ISIDORE AUGUSTE.

Postage Stamp, a stamp affixed to mail matter in payment of the postage. Postage stamps were invented by Sir Rowland Hill of England in 1840, and were adopted by the United States Government in 1847. They are now in use in all civilized countries. The postage stamp is of value only in the country where it is made. United States stamps will pay the postage on mail matter to any country, but they will not be accepted in payment of postage by any country outside the United States. The manufacture and sale of postage stamps is always a government monopoly, and it is from their sale that most of the revenue of the post office department is derived.

Postal Savings Bank. By action of the Sixty-first Congress the Post Office Department of the United States was authorized to establish savings banks in various post offices throughout the country, the offices being designated by the department. The law establishing these banks makes the following requirements:

1. That the bank shall be managed by a board of trustees, consisting of the postmaster-general, the secretary of the treasury and the attorney-general.

2. That deposits shall bear two per cent interest, but that the interest shall be reckoned only for even years and on even dollars.

3. That five per cent of the deposits in lawful money shall be kept in the Treasury of the United States and that 95 per cent of the deposits may be loaned to local state and national banks, these banks to pay two and one-fourth per

cent interest and to secure the loans by bonds or other securities.

Any one 10 years old or over may open an account. No account may be opened for less than $1, nor will fractions of a dollar be accepted for deposit. Depositors are now allowed to deposit a total of $2,500, any part or all of which may be deposited in any month. Deposits are evidenced by postal savings certificates issued in denominations of $1, $2, $5, $10, $20, $50, $100, $200 and $500.

Depositors of the postal savings system by applying therefor thirty days in advance may exchange the whole or a part of their deposits on Jan. 1 or July 1 of each year for United States registered or coupon bonds in denominations of $20, $100, and $500, bearing interest at the rate of 2½ per cent per annum, payable semiannually and redeemable at the pleasure of the United States after one year from the date of issue, both principal and interest payable twenty years from that date in United States gold coin. On Jan. 3, 1911, one postal savings bank was opened in each state and territory, a small city being selected as the location. In 1912 the number was greatly extended. In 1919 it was estimated that there were over 674,728 depositors with total deposits amounting to $135,942,981.

Post Office, a government institution for the reception, transmission and delivery of letters, newspapers, books and such other matter as may be decided upon.

Colonial Post Offices. The first step towards establishing a postal system in the American colonies was taken by the General Court of Massachusetts in 1639, when it designated the house of Richard Fairbanks in Boston as the place where all letters arriving from over the sea and all those to be sent over the sea should be left. Fairbanks was made responsible for the proper disposal of letters left in his care and was to receive one penny per letter for his services. The first step towards an intercolonial post was taken in 1692 when Thomas Neale was appointed a sort of postmaster-general by the British sovereigns, William and Mary, and given authority to establish post offices in America.

In 1737 Benjamin Franklin was appointed postmaster at Philadelphia, and from that time until the beginning of the Revolutionary War he was closely identified with the postal service. In 1753 he was appointed postmaster-general for the colonies and held the office until 1774, when his sympathy with the American cause led to his dismissal. During his 20 years of service, however, Franklin laid the foundation of the postal system of the United States.

The United States. The Constitution gives Congress power to establish post offices and post roads. At the beginning of the Revolution the colonies took charge of the postal system then in use. When the new government was organized it inherited the postal system then in existence. By an act passed in 1792 a general post office was established under a postmaster-general. The postmaster-general was not made a member of the president's cabinet until 1829.

The first mail carriers were postmen who traveled on horseback. These were succeeded by the stagecoach as fast as suitable roads were constructed, and then the stagecoach gave way to the railroad. Previous to 1845 rates of postage were very high, being six cents a letter for a distance not over 3 m., eight cents between 30 and 60 m., ten cents between 60 and 100 m. Prepayment of postage was optional with the sender, and the payment had to be made in coin. In 1845 the rates were lowered and based upon weight. In 1847 postage stamps were first used in the United States. Since then the rates of postage have been reduced from time to time to meet increasing public demands.

Railway Post Office. When railways first began to carry the mails, locked pouches marked for different stations were placed in the baggage car of the train, and then thrown off as they reached their respective destinations, and this method was in vogue until 1862,

POST OFFICE

when the first railway post office in the United States was placed on a division of the Chicago & North Western Railroad. This innovation was due to George P. Armstrong, who was for many years assistant postmaster at Chicago. The operation of the car was so satisfactory that within a few years railway post offices were found upon all long lines of railway. In these cars, whose interior is fitted up as a post office, the mail is sorted on the route, and long delays in changing from one road to another are avoided.

Classification of Mail Matter. All mail matter is divided into four classes, each having a different rate of postage.

Matter of the first class includes all letters, postal cards and written manuscripts (except manuscript with corrected proof), whether sealed or unsealed. The rate of postage is two cents an ounce or fraction thereof.

Matter of the second class includes newspapers and other papers issued at least four times a year, and periodicals sent regularly by publishers to subscribers, provided the publication has been accepted at the mailing office as second-class matter. The rate is one cent a pound or fraction thereof.

Matter of the third class includes books, printed circulars, proof sheets and manuscript copy accompanying them. Bulbs, roots and cions are also included. The rate is one cent for every two ounces or fraction thereof.

Matter of the fourth class includes all matter not in the other three classes. By establishing a parcel post in 1912, Congress greatly extended this class of matter. See Parcel Post.

Registered Letters. Letters containing money, packages containing valuables, and important documents should not be sent through the mails without registering. While registration does not make the postal authorities liable for the loss of the parcel, it does provide for such care in the transmission of the parcel that its loss is practically impossible except by fire, wreck or floods. The registration fee is ten cents.

Free Delivery. The system of delivering mail to the houses and places of business to which it is addressed was begun in 1863, and it is now universal in all towns of 10,000 or more inhabitants or whose post office receipts are at least $10,000 a year. Special delivery was provided for in 1885, and by affixing ten cents in stamps plus the postage, a letter will be delivered by special messenger on arrival at the post office to which it is addressed, provided it is a free-delivery office.

Rural Free Delivery. The first rural free-delivery route was established in 1896 as an experiment. It was so satisfactory that the system was extended as fast as appropriations could be secured for the purpose. In 1913 there were over 42,200 rural carriers, whose daily mileage exceeded 4,092,500. The maximum salary of a rural carrier is $1000, and the annual cost of this branch of the service exceeds $41,860,000.

Money Orders. The post office department facilitates the sending of money by issuing money orders which answer the same purpose as drafts. The fee for the order varies according to the amount, being three cents for an order not exceeding $2.50, to 30 cents for orders of $100. Orders are also issued on foreign countries at a somewhat higher rate. Orders cannot be obtained at nor issued upon fourth-class post offices.

Postal Savings Banks. Postal savings banks are established in all large post offices. See Postal Savings Bank.

Growth of the System. In 1790 there were 75 post offices in the United States and less than 2000 m. of post roads. The revenue from the department was $37,935, and the expenditures were $32,140. In 1913 there were 59,729 post offices and over 448,000 m. of postal roads. The receipts of the department for 1920 were $437,150,212, and the expenditures $454,322,609. The number of post offices is constantly changing. As the rural routes are extended, many of the smaller country offices are abolished.

Post Office Department, a department of the government which has charge of all matters pertaining to the mails. In nearly all countries the head of the department is a member of the ministry or cabinet, as the case may be. In England and the United States he has the title of postmaster-general. By act of Congress in 1792 a general post office was established under a postmaster-general, and the postmaster-general was made a member of the cabinet in 1829. He is appointed by the president and approved by the Senate.

Since its organization the department has been greatly enlarged. There are now four assistant postmasters-general, besides a large number of superintendents, inspectors and clerks. The first assistant postmaster-general has charge of post offices and postmasters and their appointment and instruction, of the adjustment of salaries and of the free-delivery system. The second assistant postmaster-general has charge of the transmission of the mails. The third assistant postmaster-general has charge of the finances of the department. He provides stamps, stamped envelopes and postal cards, supervises the money-order and registered-letter systems, and controls matters pertaining to the making of rates and classification of mail matter. The fourth assistant postmaster-general has charge of the rural free delivery and of the treatment of undelivered mail, supplies postmasters with blanks, stationery, etc., and has charge of making post-route maps.

The salary of the postmaster-general is $12,000; of each assistant postmaster-general, $5000.

Pot'ash", a compound chemically known as potassium carbonate. It is commonly prepared by the "leaching" of wood ashes to form lye. The lye, evaporated and heated, becomes crude potash, a white, powdery solid containing about 20 per cent of impurities. A purified form, called pearlash, contains about two per cent of impurities. Potash is used extensively in the manufacture of glass, and a supply is obtained from the natural deposits in Stassfurt, although up to the discovery of these beds the potash was manufactured by a process similar to that used in the manufacture of soda.

Caustic potash, or potassium hydroxide, is prepared by adding lime to a dilute solution of boiling potash. The caustic potash remains in solution and is obtained by evaporation. It is a white, brittle solid which dissolves in water with great liberation of heat. It has recently been prepared also from potassium chloride by electrolysis. Caustic potash is used as a disinfectant and in making soap.

Potash is one of the ingredients of the soil necessary to plant life, since it aids in producing starch; when absent it is introduced in the form of fertilizer. See SOIL; FERTILIZER.

America's annual importation of potash is valued at $15,000,000, and it has been estimated that the giant kelp thrown up on the beaches of the Pacific coast would produce more than twice the amount imported. If harvested annually, it is said the beds will produce indefinitely.

Potas'sium, an element known chiefly through its compounds, which are widely used commercially and widely distributed in various rocks and soils. It is essential to plant life, and through the use of these plants as food, enters into animal life. It occurs also in sea water and in many mineral springs. Potassium was first secured by Davy in 1807. He separated it from potassium hydroxide by means of the electric current.

Pure potassium is a white, easily-oxidized, soft metal which melts at 62° F. Since it oxidizes in moist air and easily acts upon water, it must be kept under naphtha or petroleum. Its compounds are often found in company with the similar sodium compounds. Potassium hydroxide is well known as caustic potash, or pot-ashes. Potassium chlorate is used in matches and fireworks; the bromides and iodides in medicine and photography; the sulphate for agricultural purposes; the nitrate, called niter

or saltpeter, in the manufacture of gunpowder; the cyanide for galvanic gilding and silvering; and the carbonate, or potash, for cleansing purposes. See POTASH.

Pota'to, a plant, and the widely-used tuber of that plant, belonging to the Nightshade Family. The tubers form an important food in many countries and are also valuable for their production of starch. The plant is low, has green, fleshy stems and leaves, and bears small white flowers with reflexed petals and yellow, protruding stamens. The fruit is a berry much like the tomato but is rarely allowed to develop, since its growth would take away from the nourishment stored in the tuber. The tubers are produced upon underground branches, and under cultivation become the large, firm and smooth vegetable familiarly known. The "eyes" of the potato tuber are the stem buds from which new shoots, or "sprouts," will develop.

The name Irish potato is apt to be misleading, for the plant is a native of South America and was being cultivated upon the Andean slopes before the coming of the Europeans, and still grows wild in that region. It was introduced into North America soon after, but did not become popular until the middle of the 18th century. When the potato was cultivated in Ireland the dreadful famines were stopped and so the name Irish potato was applied.

Up to the time of the Revolutionary War but two varieties of potatoes were known; now there are innumerable kinds which vary in size, color, firmness and time of ripening. Potatoes are grown from the tubers or sections of the tubers containing "eyes." Sometimes the seeds of the berry are planted, but the new plant is apt to be of a different variety from the parent, and several varieties may be produced from seeds of the same berry. Potatoes grow well in light soils in cool temperate regions and may be raised where grains will not grow. The yield of potatoes in the United States for 1918 was 400,106,000 bushels, most of which was directly consumed as food, for the potato-starch industry is not extensive. The crop varies from year to year. In Germany, since 1900, potatoes have been widely used in the production of a stock food which is put up in two forms, schnitzel and flocken. The former is made by shredding and drying raw potatoes; the latter by rolling and drying thoroughly steamed ones.

The sweet potato is not a potato at all but is the thickened root of a plant of the Convolvulus Family. See SWEET POTATO; POTATO BEETLE.

Potato Beetle, or **Potato Bug,** a small, familiar beetle of the Leaf Beetle Family. It is commonly seen crawling slowly over the leaves of the potato plants, where it deposits its masses of orange-colored eggs, generally upon the under surface. It has a rounding, cream-colored body, marked with ten dark lines, and has a short but broadly oval head. If disturbed, it may feign death or spread its wings and fly away. The larvæ are liver-colored, humpbacked creatures, having rows of black spots near the sides of the body, and they eat the potato leaves voraciously. When mature, the larvæ crawl into the ground, where the pupal stage is passed, and soon emerge as adult beetles. Because they do great damage, they are sought carefully early in the season, but their steady increase is due to the fact that there are often as many as three broods in a season, and the last broods are left unmolested ready for their destructive work in the spring. Spraying plants with Paris green (one pound to 75 or 100 gallons of water), and collecting both beetles and eggs from the leaves in the early spring are efficacious agents in their destruction. The grosbeak, often called the potato-bug bird, is fond of these beetles and greatly assists man in making way with the troublesome pests.

POTATO BEETLE

Potato-Bug Bird. See GROSBEAK.

Pot"awat'ami. See POTTAWATTOMIE.

Potomac, *Po to' mak,* **River,** a river of the United States formed by the union of its North and South branches. In the upper part of its course it flows to the northeast and east and forms the boundary between Maryland and West Virginia; it then changes its course to the southeast and forms the boundary between Maryland and Virginia. About 11 m. above Washington it passes through a picturesque gorge and forms a cataract about 1½ m. in length. The lower part of the river is a broad estuary, through which it flows into Chesapeake Bay. The main stream is about 450 m. long. It is navigable for ocean vessels to Washington. Other important places on its banks are Mt. Vernon, Arlington, Alexandria and Harper's Ferry. The chief tributaries are the Shenandoah, Cacapon, Monocacy and Bull Run.

Potosi, *Po" to see',* a city of Bolivia, situated on the northern slope of the Cerro Gordo de Potosi. It is 12,992 ft. above sea level, and is one of the highest towns in the world. The public buildings include a cathedral, the old "royal mint," a government house and a national college. Silver was discovered in the neighboring mines in 1545, and Potosi was founded two years later. Many of the mines are now abandoned. Population in 1909, estimated at 23,450.

Pot"tawat'tomie, a tribe of American Indians belonging to the Algonquian Family. They occupied the southern part of Michigan and the northern parts of Indiana and Illinois. They joined Pontiac and surprised Fort St. Joseph in 1763. They were hostile to the Americans during the Revolutionary War, but joined in the Treaty of 1795, following Wayne's victory over the Indians in Ohio. In the War of 1812 they aided the English, but three years later ceded nearly all their territory to the United States. They were given a large tract of land in Missouri, and later most of them became citizens.

Pot'ter, Alonzo (1800-1865), a bishop of the Protestant Episcopal Church, born at Beekman, N. Y., and educated at Union College. In 1821 he was appointed professor of mathematics and natural philosophy in Union College. While discharging the duties of this position, he studied theology and was ordained in 1824. From 1826 to 1831 he was rector of St. Paul's Church, Boston. In 1832 he returned to Union College as professor of philosophy and remained with the institution until 1845, when he was appointed Bishop of Pennsylvania. He was a man of great administrative ability and added much to the prestige of his denomination within his diocese.

Potter, Henry Codman (1835-1908), a Protestant Episcopal Bishop of New York, born in Schenectady, N. Y. He was educated at the Philadelphia Academy of the Protestant Episcopal Church and at the Theological Seminary of Virginia. In 1868 he became rector of Grace Church, New York City, retaining this position until he was made assistant Bishop of New York in 1883. Four years later upon the death of his uncle, who was then bishop, he succeeded to the bishopric of New York. He has been a leader in several reforms, and has written several important books, among which are *The Citizen in Relation to the Industrial Situation, The Drink Problem in Modern Life, The Gates of the East* and *The East of Today and Tomorrow.*

Potter, Paul (1625-1654), the most celebrated painter and etcher of the old Dutch School, born at Enkhuizen. He obtained his early instruction in art from his father, but the greater part of his preparation came by direct study of nature. By the time he was 15 years of age his work was attracting attention. In 1646 he went to Delft and joined the Guild of St. Luke. One of his most famous works is the life-sized picture of a young bull, which he painted for the Prince of Orange and which is now in the gallery of The Hague. He was an industrious worker and left a large number of paintings. He possessed a remarkable power of painting animals so as to make them appear natural and lifelike. His pictures include the *Bull,* the *Bear Hunt,* the *Cow* and *The Judgment of the Animals over the Hunter.*

Pot'tery, a term applied to various wares made of clay, which are hardened and made impervious to moisture by glazing and firing. The art of making such objects is known as ceramics, and is of great antiquity. Specimens of pottery have been found that came from the tombs of ancient Egypt, Babylonia and from the buried cities of Greece and Asia Minor, all indicating great artistic skill. The Greeks maintained large pottery works at Samos, Athens and Corinth. Roman slip-painted or caster ware, introduced into England and long afterwards into America during the colonial times, became famous because of its highly decorated pieces. The Arabs probably introduced glazed ware into Europe, and the Italians were the first to produce the enamel for making what is known as majolica ware (See MAJOLICA). The French obtained considerable knowledge of glazed ware from the Indians, who made at Faenza a superior article known by this name, but the French improved this glaze somewhat and gave the ware the name of *faïence* (See FAÏENCE). Delftware was first made in Holland in the 16th century. During this century Wedgwood ware was first made in England, and the Dutch introduced porcelain and chinaware from the East.

The oldest pottery in America was doubtless made by the mound builders. About 1685 the first pottery works for white and cream wares were built in Burlington, N. J., and the abundant fine clays found in that neighborhood became the attraction for many potters who came from Europe. For nearly 200 years all kinds of pottery were made there. In Trenton, N. J., and Cincinnati, Akron and East Liverpool, Ohio, are located the largest factories for making pottery in the United States.

MANUFACTURE. The clay, after being ground, is mixed with sand and water and thoroughly worked into a plastic doughlike mass, when it may be fashioned in shape by hand, thrown on the potter's wheel and formed, or fashioned by molding. For the making of circular vessels, like vases, etc., the potter's wheel has been used for centuries. In its simplest form it consists of a vertical shaft, on the top of which is attached a disk and on the bottom a larger disk resting on a pivot, which is revolved by foot power. On the top disk the potter forms with his hands the clay into a cone; then, by inserting his thumbs into the apex of the cone while the disk is revolved he shapes the vessel, keeping his hands moist all the while. Afterwards he smooths the walls both inside and out by his leather and wooden tools. If intended for finely finished ware, the vessel is finished up and polished on a turning lathe, and is afterwards placed in the drying room. Machinery now enters largely into all methods of making pottery.

Kilns used in burning or firing pottery vary in size, shape and design, according to the ware for which they are used. The higher grades of ware are subjected to a slowly increasing temperature for about 30 hours in order to drive off all the moisture, and then a very high temperature is maintained, until the products are all thoroughly vitrified, which sometimes requires several days, when the kiln is cooled slowly. When the ware is cold, it is removed, and in this state it is called biscuit. The rough places are now smoothed, and if handles or projections are required, they are cemented on by the use of a mixture called slip, and a glazing mixture the consistency of milk is applied. The vessel is again put into a kiln and the glaze is fired on. By adding various pigments to the glaze, many beautiful colorings and combinations of tints are produced. In painting the colors great care is required, since when put on, their appearance is entirely different to that acquired after the firing has been completed.

VARIETIES. Several well-known varieties are here given. Earthenware consists of all the coarser wares, from the ordinary stoneware, of which jugs and crocks are made, to the heavier grades, used for sanitary purposes. Table stoneware is a high grade of earthenware generally well enameled

with porcelain and glaze, and often decorated in colors. Chinaware, or porcelain, is the finest grade of pottery, and it is made of the finest white clays, which are free from metallic oxides. Kaolin, or china clay, is the principal clay used, and it is fused for a long time at very high temperatures and sometimes annealed by many reheatings. Porcelain originated with the Chinese about 950 B. C., and they still show great skill in its manufacture. Its introduction into Europe was in the early part of the 16th century. The oldest pottery in Europe is at Dresden, and the finest chinaware is made in Sèvres, France. See TERRA COTTA; BRICK; TILES; VASE.

Potts'town, Pa., a city of Montgomery Co., 35 m. n.w. of Philadelphia and 18 m. s.e. of Reading, on the Schuylkill River at the mouth of the Manatawny Creek, on the Schuylkill Canal and on the Philadelphia & Reading and the Pennsylvania railroads. It was settled in 1752 and first named Pottsgrove; in 1815 it was incorporated as a borough and named Pottstown. The town is the trade center of a large agricultural region with considerable mineral wealth, its iron and steel interests being very extensive. There are large rolling mills, bridge and nail works, agricultural-implement works, boiler and machine shops and manufactories of bricks, shirts, hosiery, etc. It is also the seat of the Pottstown Business College and of the Hill School, a private nonsectarian school for boys. In one of the outlying parks are the well-known "ringing rocks." The size of the borough was increased in 1888. Population in 1920, U. S. Census, 17,431.

Potts'ville, Pa., county seat of Schuylkill Co., 35 m. n.w. of Reading and 93 m. n.w. of Philadelphia, on the Schuylkill River and Canal, at the mouth of Norwegian Creek, and on the Philadelphia & Reading, the Central of New Jersey, the Pennsylvania and the Lehigh Valley railroads. It is picturesquely situated at the base of Sharp Mountain and is partly built on the sides of several steep hills. Pottsville is surrounded by the productive anthracite fields of the Schuylkill coal region and is an important coal-mining and shipping center. The more important establishments include the large plant of the Eastern Steel Company, and shops of the Pennsylvania and Philadelphia & Reading railroads. The manufacturing industries include the manufacture of iron and steel, brass, hosiery, velvets, silks, lumber, flour and carriages. The place was settled about 1800 and laid out as a town by John Pott in 1816. It was incorporated as a borough in 1828. Population in 1920, U. S. Census, 21,876.

Poughkeepsie, *Po kip' sy,* **N. Y.,** a city and county seat of Dutchess Co., 74 m. n. of New York and 14 m. s. of Kingston, on the east bank of the Hudson River, and on the New York Central & Hudson River, the New York, New Haven & Hartford, the Central of New England and other railroads. There is also ferry and bridge connection with the West Shore railroad. Electric railway lines connect the city with the towns and cities on both sides of the river. Poughkeepsie is an important port for the various lines of Hudson River steamers between New York, Albany and Troy. A cantilever railroad bridge, 212 ft. above the water and 6767 ft. long, crosses the Hudson at this point. The city is attractively situated, a part of it being on a plateau above the river and a part on the river slope. The Hudson here affords the course for the annual intercollegiate boat races for American colleges, with the exception of Yale and Harvard. The city has many miles of paved and well-shaded streets and handsome residences. College Hill Park of 100 acres is in the northeastern part of the city and commands fine views. Eastman Park is in the center of the city.

Poughkeepsie is distinguished for the number and excellence of its educational institutions. Vassar College, one of the most famous women's colleges in America (See WOMEN, COLLEGES FOR), has fine buildings and extensive grounds. Other institutions of learning include Glen Eden School for girls, Berkeley

School for boys, Riverview Academy, Putnam Hall for girls, St. Faith's School (Episcopal), Eastman Business College and Adriance Memorial Library. The charitable institutions include St. Francis and Vassar Brothers' hospitals, Vassar and Pringle Memorial homes for aged men, Poughkeepsie Orphan Home and an old ladies' home. The Vassar Brothers Institute is one of the fine buildings of the city. Two miles north of Poughkeepsie are the imposing buildings of the Hudson River State Hospital for the insane. The manufacturing industries of the city include blast furnaces, foundries and machine shops, glassworks, flour mills, mowing-machine and cream-separator works and manufactories of underwear, shoes, patent medicines, tobacco and cigars, sash and blinds, woodenware, horseshoes, furniture, silk thread, wagons and carriages and hardware specialties.

Poughkeepsie was settled by the Dutch in 1698. On the same site there had been an Indian village named Apokeepsing, meaning safe harbor. During the Revolutionary War it was an important base for the Continental army. The New York State Legislature met here during the Revolutionary War period, and here in 1788 assembled the state convention which, under the leadership of Alexander Hamilton, ratified the Federal Constitution. The village was incorporated in 1799 and in 1854 a city charter was granted. Population in 1920, 35,000.

Poul'try, domestic fowls raised for the table or for their eggs and feathers. The term includes cocks, hens, capons, ducks, turkeys, geese, guinea fowls and pigeons. The common fowl has always led in importance, and few farms are without at least small flocks. Turkeys, geese and ducks are next in importance. The number of fowls kept in the United States is over 325,000,000, having an estimated value of nearly $275,000,000. Many useful poultry books and journals are published which give valuable assistance in the care of all kinds of poultry. Consult Weir, *The Poultry Book,* and Brown, *Races of Domestic Fowl.* See FOWL, DOMESTIC; SQUAB; EGGS; TURKEY; GOOSE; GUINEA FOWL; PIGEON.

Pound. See WEIGHTS AND MEASURES.

Pound'al, the unit of force in the English, or foot-pound-second, system. It is a force that, acting for one second on a free mass of one pound, will give it a velocity of one foot per second. Since gravity acting for one second on a free body will give it a velocity of 32.16 ft. per second, gravity must exert a force of 32.16 poundals on a mass of one pound. Hence the force required to support a one-pound mass (commonly, but not correctly, called weight) can be measured either as one pound or as 32.16 poundals.

Poussin, *Poo" sahn',* **Nicolas** (about 1594-1665), the greatest French painter of his time. He learned his art in Italy and spent his life there, except for a brief interim at Paris where he occupied the position of "first painter in ordinary" to Louis XIII. He was gifted with a fine sentiment and a vigorous conception. Upon the French School he exercised a potent influence, introducing into it the classical and academic element. He was the originator of the classic landscape. His chief works include *The Shepherds of Arcady, Orpheus and Eurydice* and *Triumph of Flora.*

Pow'der. See GUNPOWDER.

Pow'derly, Terence Vincent (1849-), an American lawyer, born at Carbondale, Pa. He secured his education in the schools before he was 14 years of age, was a switch tender, then a machinist until 1877. In 1878 he was elected mayor of Scranton, Pa., on the Labor ticket. In the following year he was elected general master workman of the Knights of Labor, and held the position until 1893. As leader of this great labor organization Powderly attained a national reputation as an orator and administrator. He was United States commissioner-general of immigration from 1897 to 1902, and was appointed special representative of the United States Department of Commerce and Labor in 1906, and since 1907 has been chief of

the Division of Information in the United States Bureau of Immigration. He has written *Thirty Years of Labor, History of Labor Day* and numerous articles on economics and other subjects.

Pow'ell, John Wesley (1834-1902), an American geologist, born in Mt. Morris, N. Y., and educated at Illinois and Oberlin colleges. Following the Civil War, during which he was promoted lieutenant-colonel, he was successively professor of geology in the Illinois Wesleyan and in the Illinois Normal universities, and after 1867 he made a geological and geographical survey of the Rocky Mountain region, being the first explorer of the canyons of the Colorado. In 1881 he became director of the United States Geological Survey. His publications include the highly recognized *Contributions to North American Ethnology.*

Pow'er, in physics and engineering, the rate at which work is done. The most common engineering unit is the horse power, which is the power exerted when work is done at the rate of 33,000 foot pounds per minute. In electrical and scientific work the unit most employed is the watt, which equals one joule per second. One-horsepower equals 746 watts. See FORCE; ENERGY; WORK.

Powers, Hiram (1805-1873), an American sculptor, born at Woodstock, Vt. His artistic career began with the execution of portrait busts of leading men of his time, among them General Jackson, Daniel Webster and John C. Calhoun. In 1837 he went to Italy, where he remained the rest of his life and where he made numerous statues, among them the *Greek Slave, Prosperine* and *Fisher Boy.*

Pow"hatan' (about 1550-1618), an Indian head chief of about 30 tribes or 8000 subjects. His name was Wahunsonacook, but the name of his tribe was Powhatan, so the English settlers called him also by this name, which signifies the official title of a line of Indian kings. On becoming emperor, Powhatan lived chiefly on the York River, in Gloucester County, Va. Stories most generally associated with his name tell of his having spared the life of Capt. John Smith, who was his prisoner, only through the sympathy of his daughter, Pocahontas; of his being crowned by the King of England, through Captain Newport; and of the kidnaping of Pocahontas by Captain Argall. This last incident almost destroyed Powhatan's friendship for the English settlers; but the marriage of his daughter to John Rolfe healed the threatened breach, and thereafter until his death the chief extended the greatest hospitality to the colonists.

Poyn'ter, Sir Edward John (1836-1919), an English historical and decorative painter and author, born in Paris. He studied at Leigh's Art School and at the Royal Academy in London, and in Paris. He was Slade professor of fine arts at University College, London, director of the art schools at the South Kensington Museum and director of the National Gallery. In 1896 he succeeded Millais as president of the Academy. His most notable pictures include *Israel in Egypt, Atalanta's Race, The Ides of March, Idle Fears* and numerous portraits and water-color drawings. In his series of Slade lectures, first published in 1879, he has dealt with the entire field of art education.

Prætor, *Pre' tor,* the title of an important magistrate of the ancient Romans. The title was first applied to the consuls, but the prætorship became a separate office 366 B. C., and at first was open only to patricians as a compensation for making plebeians eligible to the consulship. The prætor was placed in charge of the judicial duties which formerly devolved upon the consul. As these duties multiplied, the number of prætors was increased until it finally reached 18. The term of office was one year, and on his retirement the prætor was usually appointed governor of a Roman province. In 337 B. C. the office of prætor was thrown open to the plebeians.

Prætorian Guard, *Pre to' ri an Gard,* a body guard of the Roman emperors, established by Augustus. In time they became so powerful that they made and

deposed emperors at will. Septimius Severus reorganized them by forming new cohorts out of the best legions serving on the frontiers. They were abolished by Constantine the Great in 312.

Prag'matism (from Greek *pragma,* a thing done, business) in general, a philosophic doctrine or mental attitude which represents a reaction against metaphysical speculation in the interests of practical life. It determines the truth of ideas not so much by the test of logical thinking as by their practical consequences. It holds that thought does not aim at the comprehension of truth in general, but at the discovery of the best means for the accomplishment of definite ends demanded by life.

Prague, the capital city of Czecho-Slovakia, also of the province of Bohemia situated on both banks of the Moldau river, about fifty miles from the German boundary. The nucleus of the present city is the Alstadt on the right bank of the river. This was once a walled city, but the ramparts long since disappeared. Around it, on all sides except the river front, was built the Neustadt. On the left bank of the river are two other distinctive parts of the city, one of which is an eminence dominating the entire city. In addition there are two important manufacturing suburbs in close connection with the city itself. A number of bridges connect the two parts of the city. Islands in the river are laid out as parks. Among the buildings of prominence is the Teyn Church, religious center of the Hussite Movement, the town hall, the Bohemian Museum, the Bohemian National Theater and a number of beautiful churches. Owing to its location and political importance, the industry and commerce of Bohemia center in Prague and its manufacturing suburbs.

The University of Prague is of historic interest. It was the first university in Germany, and long the most prominent. It was founded by Charles IV, emperor of Germany. At one time, as many as 15,000 students attended its lectures. The great Bohemian martyr, John Huss was its rector in 1402. A distinctively Bohemian university was established in 1882, due to the growing sense of nationality among the Czechs of Bohemia. It has prospered and from this time on will be the University of Prague.

Behind Prague is a thousand years of history. Owing to the strategical importance of its location it has always figured in German history. In the days of Charles IV (1347-1378) it was the most important city of Germany. This season of prosperity passed, but in the reign of Rudolph II (1576-1612) it again became prominent. Copernicus, Tycho Brahe, and other scholars of the day flocked to his court. A new cycle in its history began when Thomas G. Masaryk was inaugurated in Prague, president of Czecho-Slovakia.

Prai'rie Dog, an interesting but destructive member of the gopher tribe of squirrels. It is found on the Western plains of the United States, where a large community will cover many acres. Prairie dogs are sociable creatures and seem to band together for purposes of friendliness as well as of protection. They have gray-brown coats, which shade to a dirty white underneath, pouched cheeks and long, thin tails which jerk with each barking cry. They are almost defenseless against their natural enemies, the snakes and ferrets, but depend for safety upon quickness in reaching their burrows. As they clear the ground, around their homes, of the grasses and herbage, they lengthen their galleries and increase the compartments, making new entrances nearer the base of supplies; thus a community will lay waste a tract sufficient, says the United States Department of Agriculture, to support 1,500,000 cattle. Since they are very prolific, prairie dogs are a great nuisance and their extermination is desirable.

Prairie Hen, a bird of the Grouse Family. The prairie hen is about 19 inches long, barred all over with brown and white; the head is buff with dark brown stripes. The male has an orange-colored inflatable air sac on each side of

the neck, with several stiff, pointed feathers just over it. The nest is made in a depression in the ground, usually in open prairies or fields. It is sometimes lined with grass and feathers and contains 11 to 14 buff-colored eggs, which are sometimes speckled. In winter these birds gather in flocks of considerable size and feed upon the berries of the haw and upon other winter fruits and buds. In early spring the males begin courting the hens, strutting with outstretched tail, drooping wings and erect neck-tufts. They emit a loud, booming noise by inflating the air sacs and letting the air out in gulps. This booming is continued throughout the breeding season. The prairie hen ranges from Manitoba to Texas and is a valuable game bird. It has been hunted to such an extent that in many localities it has become extinct.

Praxiteles, *Prak sit' e leez,* a celebrated Greek sculptor, living in the fourth century B. C. He was a citizen of Athens. His most famous works are known to us only through Roman copies. Best known of these was the *Aphrodite of Cnidus,* called by Pliny the finest statue in the world, and a copy of which is in the Vatican. Praxiteles was famous for his satyrs, one type of which is represented by the Capitoline statue immortalized in Hawthorne's *Marble Faun.* One undoubted original of this artist was discovered in 1877 during the excavation of Heræum—the *Hermes of Olympia.* The modeling of this statue is so perfectly balanced that the whole gives the impression of numberless details, no one of which has received undue prominence.

Preb'le, Edward (1761-1807), an American naval officer, born in Portland, Me. He served with distinction in the Revolution, was one of the first lieutenants commissioned in the United States navy, and in May, 1803, took command of the squadron sent against the Barbary States. Having forced Morocco to renew the Treaty of 1786, he blockaded the port of Tripoli for months and made six effective attacks on the town and the Tripolitan fleet. Superseded, 1804, he returned to the United States, to be thanked by Congress and offered the secretaryship of the navy by Jefferson. See BARBARY STATES, WARS WITH.

Preble, George Henry (1816-1885), an American naval officer born in Portland, Me. Entering the navy in 1835, he served in the Mediterranean and West Indies and in the Florida and Mexican wars, and accompanied Perry's expedition to Japan. During the Civil War, while commanding the *Katahdin,* he was at New Orleans, later took part in blockading Mobile Bay and was dismissed for letting the *Florida* escape; subsequently, however, he was reinstated and in 1864 cooperated with Sherman along the coast. Following the war he commanded various navy yards and the South Pacific Squadron, retiring in 1878 with the rank of rear-admiral.

Precession of Equinoxes, *E' kwi nox ez,* the retrograde movement of the equinoctial points along the ecliptic. The cause of this lies in the fact that the earth is not exactly round, having additional matter in the belt of the equator. At all seasons of the year, except at the equinoxes, when the plane of the equator passes through the center of the sun, the attraction of the sun upon this extra belt of matter at the equator has a tendency to tilt the earth over so that the equator crosses the line of the ecliptic at about 50 inches of space earlier each year. At this rate the equinoctial points will back around the ecliptic once in about 25,800 years. Since the naming of the signs of the zodiac from the constellations in which they lay, over 2000 years ago, the precession has carried the signs backward 30 degrees, so that the sign Aries is now in the constellation Pisces. See ECLIPTIC; EQUINOCTIAL; EQUINOX; ZODIAC.

Precious, *Presh' us,* **Stones,** small stones highly prized for their beauty. The term *gems* is usually applied to those precious stones which have been cut and mounted. In their natural state some precious stones occur as clear crystals, but most of them are covered with a coating which hides their beauty. The

precious stones of greatest value are the diamond, the emerald, the ruby, the sapphire, the opal and the turquoise. Of less value are the agate, the carnelian, the almandine, the amethyst, the tourmaline and the topaz. Precious stones were known to the ancients, but they did not acquire the art of cutting the hardest and most valuable varieties, such as the diamond, the ruby and the sapphire. Nearly all gems have been imitated. See GEMS, ARTIFICIAL.

Cutting and engraving precious stones is an art requiring great skill. For a description of the process, see DIAMOND. A cameo is a stone on which the design is raised above the general surface. Cameos are usually cut on stones having layers of different colors so that the raised figure will have one color and the general surface another. An *intaglio* is a stone on which the design is sunk below the general surface. Intaglios are often cut in transparent stones.

Preemption, *Pre emp' shun.* See LANDS, PUBLIC.

Prentice, *Pren' tis,* **George Denison** (1802-1870), an American journalist, born at Preston, Conn., and educated at Brown University. Though admitted to the bar, he never practiced law. He was on the staff of the *New England Weekly Review* for two years, and from 1830 until his death edited the Louisville (Ky.) *Journal,* now the *Courier-Journal,* which, by his satire and political ability, he made the most influential Whig paper of the West. His attitude was instrumental in keeping Kentucky in the Union at the outbreak of the Civil War. His writings include *Life of Henry Clay* and *Poems.*

Pres"byte'rians, the members of a Protestant religious denomination the government of which is in the hands of the presbyters, or elders; thus, though the name is ordinarily applied to that sect which accepts the Westminster Standards, it really includes all having this certain form of church government. The Church is largely a doctrinal organization, but accepts to membership all who believe in Christ, regardless of doctrinal views. Of its officers, however, it requires assent to the Church standards. The Church had its inception at the signing of the First Covenant at Edinburgh in 1557, but was first firmly organized by the Westminster Assembly summoned by act of Parliament in 1643. This assembly was in session until 1647. The result of the labors of this body was the Westminster Confession of Faith, the Westminster Longer Catechism and the Westminster Shorter Catechism. The standards, founded wholly upon Bible teachings, follow many of Calvin's interpretations and teachings; hence the Church doctrinal system is known as Calvinism, though founded a century after Calvin's death (See CALVIN, JOHN).

In Scotland the Presbyterian form of ecclesiastical government had been established as early as 1560 by Knox (See KNOX, JOHN), and the Presbyterian has since that time been the leading Church of that country. Representatives from it were sent to the Westminster Assembly, and there aided in formulating the creed of the Church. There are several branches of the Church, many of which have originated in the United States. The Southern Church separated from the original body at the time of the Civil War; the United Presbyterian Church uses only psalms as hymns; the various Reformed Churches do not approve of army service nor of jury duty.

There are in the United States over 16,700 Presbyterian bodies having about 2,000,000 communicants. The total number of Presbyterians in the world is said to be about 13,000,000.

Prescott, *Pres' kut,* **Ariz.,** a city and county seat of Yavapai Co., 137 m. n. of Phoenix, on the Santa Fe, the Prescott & Phoenix and other railroads. It is situated upon a plateau at an altitude of 5000 ft. The surrounding country is rich in mineral resources, gold, silver and copper being the chief products of the mines. Lumbering and stock raising receive considerable attention. The educational institutions are St. Joseph's Academy and St. Xavier's Indian School, while St. Mary's Hospital and

Home for Children, St. Mary's Sanitarium and the public library are other conspicuous features of the city. Prescott was at one time the capital of the Territory of Arizona. Population in 1920, U. S. Census, 5,010.

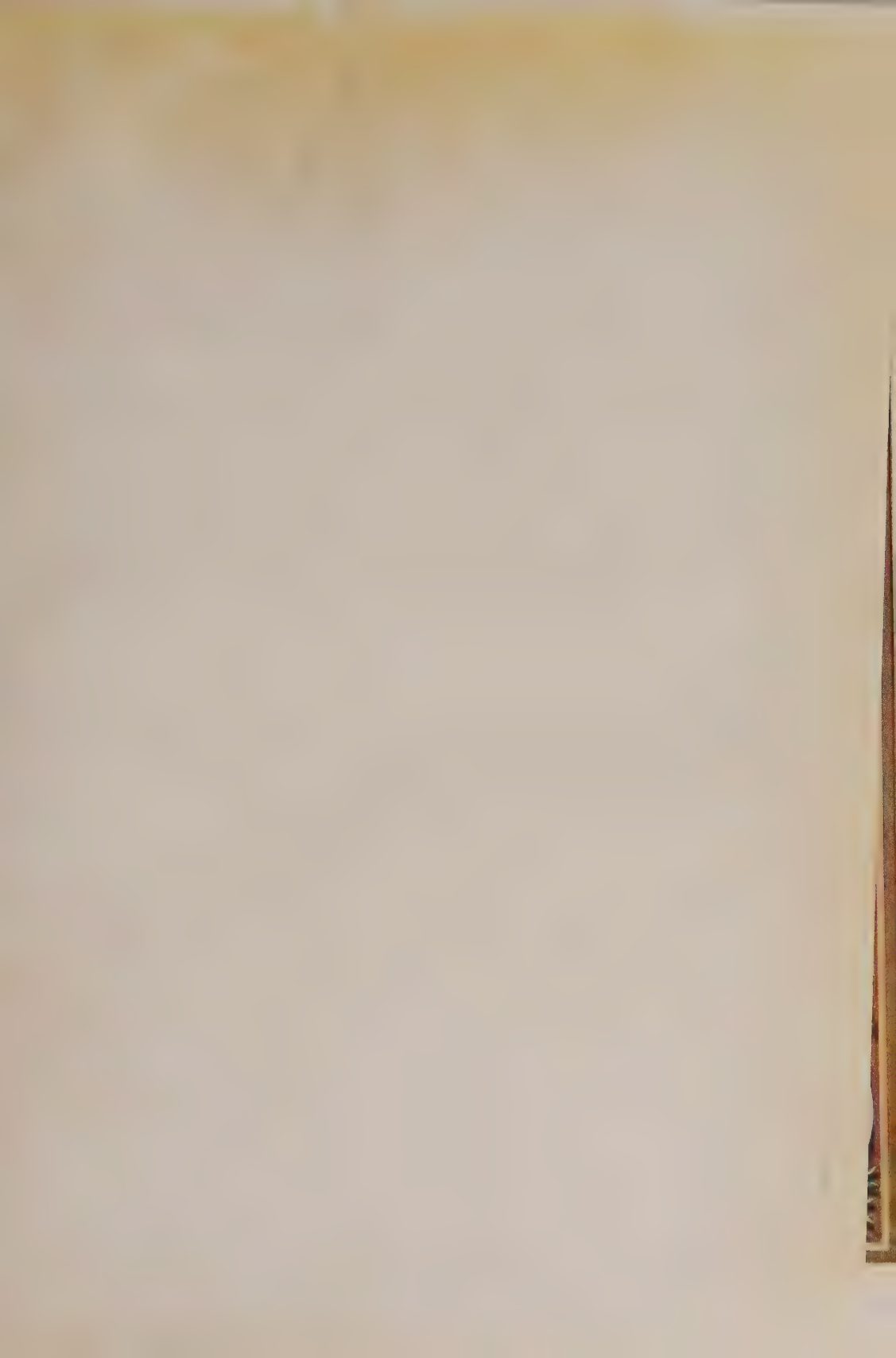
Prescott, William (1726-1795), an American soldier of the Revolution, born at Groton, Mass. He served in the French and Indian War as lieutenant and captain, refused a commission in the regular British army and retired to his home at Pepperell, Me. Immediately following the Battle of Lexington, he organized a company of minutemen, with himself as colonel, and joined the American forces at Cambridge. He commanded at Bunker Hill and at Breed's Hill, June, 1775, and was the last one on the ground after the final British assault. Following the Battle of Bunker Hill Prescott entered the regular service, from which he resigned in 1777. He returned, however, as a volunteer at Saratoga. Following the war he sat in the Massachusetts Legislature.

Prescott, William Hickling (1796-1859), an American historian, born at Boston, Mass. He graduated at Harvard College in 1814, and entered his father's law office the following year, but the loss already of the sight of one eye, with a threatened similar affliction of the other, forced him to give up his work and resort to traveling, while seeking medical advice. A reading of Gibbon's autobiography fascinated him with historical writings, and he turned his attention wholly to literary and historical pursuits. He first reviewed Byron's *Letters on Pope* for the *North American Review,* took up a study of French, Italian and German literature, and then turned, on the advice of his friend, Ticknor, to the field of Spanish history.

For ten years he worked hard, with the aid of secretaries and readers, and in 1838 appeared the three volumes of the *History of the Reign of Ferdinand and Isabella the Catholic.* Six years later he completed the brilliant *History of the Conquest of Mexico, with a Preliminary View of the Ancient Mexican Civilization, and the Life of the Conqueror, Hernando Cortes.* Through these historical researches and his romantic descriptions, which are accurate in so far as is consistent with the archæological knowledge of his time, the whole of Spanish history was revealed to the English-speaking world. He wrote in a dignified and refined style, and the only serious defects of his admirable work are the overenthusiastic praise of his heroes and a deficient treatment of political situations. Among American historians he ranks as one of the earliest and most accomplished. His other works include *History of the Conquest of Peru, with a Preliminary View of the Civilization of the Incas; History of the Reign of Philip the Second, King of Spain; Biographical and Critical Miscellanies;* and memoirs of John Pickering and Abbott Lawrence.

Prescrip'tion, in law, a term denoting a right or title gained by time or use. The importance of prescription was formerly much greater than at the present time. In the United States it is restricted to real property and to positive rights, such as the right of way and the right of drainage. In all states prescription is regulated by statute, but, in general, an uninterrupted possession of an easement for 20 years gives the holder a title to the same.

President, *Prez' i dent,* the supreme executive officer of the United States. To be qualified for this office a man must be a natural-born citizen of the age of 35 years and must have resided 14 years within the United States. He is elected for a term of four years by electors chosen by the people of each state in such manner as the Legislature thereof may direct, each state being entitled to as many electors as it has senators and representatives in Congress. The practice in every state is to choose the electors by popular vote on a general ticket. The powers of the president are prescribed by the Constitution. He is inaugurated on the fourth of March following the election, and is eligible for reelection without limit as to the number of terms, but the precedent set by Wash-



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PRESIDENTS OF THE UNITED STATES

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PRESIDENTS OF THE UNITED STATES

ington of refusing a consecutive third term has not been broken. The president is required before entering upon the discharge of his duties to swear or affirm that he will faithfully execute the duties of the office to which he has been elected, and to the best of his ability preserve, protect and defend the Constitution of the United States. He delivers a public address on the occasion of his inauguration, in which he announces his political policy. In case of death or disability of the president, the vice-president succeeds to the office. On death of both president and vice-president the cabinet members succeed to the presidency in the following order: secretary of state, secretary of the treasury, secretary of war, attorney-general, postmaster-general, secretary of the navy and secretary of the interior.

The president receives compensation for his services in a salary of $75,000 per year, and is also allowed the use of the executive mansion and $25,000 a year for traveling and other expenses, but is prohibited by the Constitution from accepting any emoluments from any one of the commonwealths or from any foreign prince or king. He is exempt from any court's jurisdiction but may be impeached by the House of Representatives for treason, bribery or other misdemeanor.

The duties and powers of the president include the calling together of Congress in special session when considered imperative, the management of the foreign relations of the United States, the command of the army and navy, the granting of pardons, the execution of the laws and the appointment of the officers of the United States not under the civil service law.

President and Little Belt, Affair of the, in American history, an incident which intensified feelings previous to the War of 1812. With the repeal of United States trade restrictions with France, British vessels had come over to capture American merchantmen, and in May, 1811, Capt. John Rodgers of the frigate *President* put to sea from Chesapeake Bay to find the *Guerrière,* which had just impressed a United States citizen off New York. On May 16, when 30 m. off Cape Charles, Rodgers saw what he thought to be the *Guerrière,* but what in reality was a small British frigate, *Little Belt.* The *President* approached her but she sailed on, showing no color, and in the chase which followed she was overhauled and a battle ensued, the *Little Belt* becoming unmanageable and losing 32 men in killed and wounded. Not until morning did Rodgers learn the identity of his enemy. As the dispute as to which vessel was to blame could never be settled, the affair was dropped, by mutual consent. See CHESAPEAKE AND LEOPARD, AFFAIR OF THE.

Presidential Succession, the order in which subordinate officers of the government succeed to the presidency, in case of the death of the president or his removal from office for any misdemeanor or disqualification to hold longer the office of chief executive. The Constitution provides that the vice-president shall become president in the event of such vacancy and he shall hold the office for the remainder of that presidential term, but the death of Vice-President Hendricks in 1885 soon after his inauguration called attention to the fact that there was no provision for succession in case both the president and vice-president were removed by death or disability before Congress had assembled. In 1886, therefore, a law was passed providing that members of the cabinet, in the order of the establishment of their respective departments, should succeed to the presidency, provided they were eligible, the order of succession being secretary of state, secretary of the treasury, secretary of war, attorney-general, postmaster-general, secretary of the navy and secretary of the interior.

By the terms of the succession law the high office passes to a member of the cabinet who may be relied upon to continue executive control along lines outlined by his former chief. Another provision of this law makes it necessary for Congress to assemble within 20 days

from the succession of a cabinet member.

President's March. See HYMNS, NATIONAL, subhead *Hail Columbia.*

Press, Freedom of the, the freedom of any citizen to print or publish whatever opinions he desires, being personally responsible for such publication. Newspapers and other periodicals have full freedom guaranteed by the constitutions of their respective states to publish criticisms of public officers and state Legislatures and Congress. If, however, criticisms attack the private life or cast a stain upon the character of one holding public office, the paper is liable to a suit for libel (See LIBEL). The Constitution of the United States forbids Congress to pass any law restricting the freedom of the press. The freedom of the press is now established in nearly all civilized countries, except in times of extreme emergency, as in war.

Prevail'ing West'erlies, or **Anti-Trades,** winds that blow from the west in the north and south temperate zones. They are caused by the descent to the surface of the air which flows from the equator as an upper current. When these currents descend to the surface they become westerly winds. In the Northern Hemisphere they are not so regular as the trade winds. Like the trade winds the prevailing westerlies move north and south with the change of seasons. See TRADE WINDS; WIND.

Prevost, *Pre vo'*, **Sir George** (1767-1816), a British soldier and governor, born in New York. In 1805 he was made a baronet and major-general, and three years later became lieutenant-general. In 1808 he was made lieutenant-governor and commander-in-chief of Nova Scotia; and in 1811 he became governor of Lower Canada and governor-general of British North America, holding this position throughout the War of 1812.

Pri'am, King of Troy during the Trojan War. He received his name, meaning the ransomed, because he was ransomed by his sister Hesione when captured by Hercules. He married Hecuba as his second wife, by whom, Homer tells us, he had 19 sons. He is said to have had 50 sons and as many daughters. The most famous of his children were Hector, Paris, Troilus and his daughter Cassandra. He was too old to fight in the Trojan War. Homer gives a pathetic and noble scene where Priam goes to the tent of Achilles and begs the body of Hector, his hero son, for burial. Vergil writes that he was slain by Pyrrhus when the Greeks took Troy.

Pribilof, *Pre" be lof'*, **Islands,** a group of small islands in the North Pacific Ocean belonging to the United States. The principal islands are St. Paul, St. George, Walrus and Otter. These islands were formerly a source of great wealth because of the large numbers of fur seal bred there, but the ruthless slaughter of these animals has so reduced their numbers that they are now under government protection. See FUR SEAL.

Price, Sterling (1809-1867), an American soldier, born in Prince Edward County, Va. He was educated at Hampden-Sidney College. In 1831 he settled in Missouri. He was representing this state in Congress when he resigned to serve in the Mexican War, during which he participated in Kearney's expedition to California and in the Mexican defeat near Chihuahua. He was governor of Missouri from 1853 to 1857. At the outbreak of the Civil War he became major-general of the Missouri militia, and during the conflict he contested with Fremont and Curtis for possession of Missouri, served under Beauregard and Van Dorn east of the Mississippi, and in 1863 was assigned west of that river, where he operated until the close of the war.

Prickly Ash, an American shrub of the Rue Family found in the woods in many parts of the United States. It attains a height of not more than 10 or 12 ft., but in the South a species, known as Hercules'-club, is a tall tree. The branches are marked with thick, strong spines which do not seem to be at all the accompaniment of the feathery, light

green leaves of spreading, fragrant leaflets. The flowers are in dense clusters, having five greenish, petal-like sepals and no petals. The leaves and flowers appear about the same time, and after the flowers fall, large black seeds develop. The bark of the prickly ash is bitter and aromatic; it is used medicinally as a stimulant and to relieve the pain of rheumatism and like ailments.

Prickly Pear, or **Indian Fig,** a name given to a number of species of the Cactus Family known in the United States from New England west and south, but most common in the Southwestern States. The common prickly pear has the ordinary characteristics of the cactus, a flat, jointed stem having in place of the leaves short, clustered spines. The stems are irregular in shape but the sections are generally somewhat oval in form. The flowers grow on cylindrical columns and are red, white or yellow in color; the fruit, which is juicy and highly nutritious, resembles the pear in shape but in some varieties has a spiny surface. In many tropical countries the fruit is used as food for both man and cattle. The prickly pear is the species of cactus upon which the cochineal insect feeds, and is therefore of commercial importance aside from its food value. See COCHINEAL.

Priest, *Preest,* in a general sense, the title of a minister of public worship. The term is most frequently applied, however, to one having the duties of mediator or minister of sacrifice. The priesthood is a very ancient institution. The early Babylonian priests were little more than exorcisers, their duty being to offer libations and to preside over sacrifice, but among the ancient Hebrews, Egyptians and Hindus we find a highly developed form of priesthood. According to later Jewish theory, the priesthood among the Hebrews was the office of the family of Aaron, while the other members of the tribe of Levi were the assistants of the priests in the service of the sanctuary. In early times, however, heads of families and various religious leaders performed priestly duties.

The office of high priest was hereditary and was invested with kingly power at the time the Maccabees ruled Israel, but in the time of Christ the Roman officials appointed and deposed the high priests at will (See HIGH PRIEST). When Jerusalem was destroyed in 70 A. D. the Hebrew priesthood ceased to exist. In both Egypt and India the priests were members of the highest caste (See EGYPT; BRAHMANISM). In the Christian Church, the Roman Catholics hold that Christ gave his disciples his mediatorial powers and that they have committed these powers to their successors. Roman Catholic priests are not permitted to marry, but in the Greek Church celibacy is not required of a priest. In the churches of the Anglican Communion priests form the second order of the clergy. Among most Protestant bodies the officiating religious teachers are known as ministers.

Priestley, *Preest' ly,* **Joseph** (1733-1804), an English chemist and minister, and a most voluminous writer on both chemical and theological topics. His scientific reputation, which he did not gain until about 1770, arose from his investigation of different kinds of "airs:" "fixed air," or carbon dioxide, and "dephlogisticated air," or oxygen. Priestley's experimental work was chiefly along the line of blind experiment; he heated compounds, added acids and treated the resulting substances with whatever he had at hand, and tabulated his results. By this means he separated many chemical compounds.

Pri'mary, or **Primary Election,** an election for the purpose of nominating candidates for office. The name is also given to elections for choosing delegates to a political convention. The primary differs from the general election in that only members of one particular party participate in it. However, under the Australian ballot, all parties may hold their primaries on the same day, and the members of these parties may vote at the same place. In fact, in some states the law requires that this be done. The tickets for the different parties have dif-

ferent colors, as red for the Democratic, white for the Republican, yellow for the Socialists and so on. When a voter enters the polling place, he announces the party to which he belongs and is given the ticket for that party. The candidates receiving the largest number of votes are the nominees of their respective parties.

The advantages of primary elections are that they give all legal voters an opportunity to have a voice in nominating candidates for office, and tend to foster an active interest in political affairs; that they are a check upon machine politics, and tend to prevent the nomination of unsuitable candidates; and that they are a check upon political corruption, such as the use of patronage and money on the part of political bosses. The chief objection against them is that candidates selected by the voters at large are not likely to be so well qualified for the offices they are to fill as those chosen by a small number of men who are more thoroughly conversant with the duties and responsibilities of the offices. The popularity of primary elections has increased rapidly since the beginning of the 20th century, and in 1912 so-called presidential primaries, at which the voters expressed their preference for candidates for president, were held in a large number of states. See ELECTORAL COLLEGE; PRESIDENT.

Prima'tes, the highest order in the group Mammalia, and the one including man, the apes, the monkeys and the lemurs. A common characteristic of all members of this group is the possession of five fingers or toes, upon each limb; in the higher groups of Primates the forelimbs are specialized into grasping organs, while the other pair support the body. The sole of the foot, rather than the toes alone, rests upon the ground, giving the Primates the plantigrade, or flat-footed, walk. The young are born in a comparatively helpless state and are fed and cared for until able to look out for themselves. The lower Primates spend their lives chiefly in the trees, where they live upon a vegetable diet.

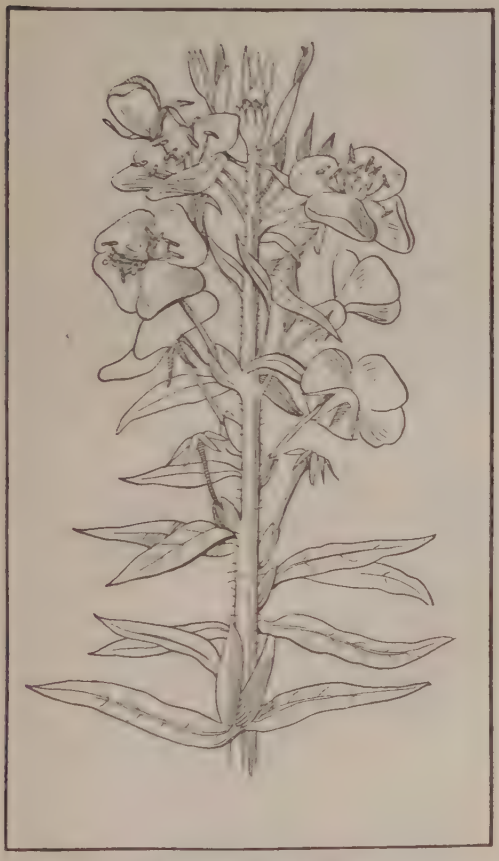
Man differs from the other members of the order in having an erect walk, a more enlarged cranium and a less prominent jaw. His power of speech is, no doubt, a result of higher brain power and not of any physical modification. See ZOOLOGY, subhead *Classification.*

Pri"mogen'iture, the right of the eldest son to inherit the real property of an ancestor. The term has sometimes been employed in a wider sense to describe any priority which the law has accorded to the first born. The term is now usually restricted to the rule of inheritance which has for centuries maintained itself in the common-law system, whereby the eldest son is entitled to the whole real estate. If he is dead but has left an eldest son the latter succeeds to his father's right. If the whole male line is exhausted then the daughters succeed jointly, except in the case of the crown, to which the eldest succeeds. No distinction of age or sex is made in the descent of estate in the United States.

Prim'rose", a name applied to a number of plants of the Primrose Family. Probably those most familiar are the greenhouse varieties, which may be either hardy or delicate plants with rough, wrinkled leaves crowding closely about the roots, from which also rises the straight, leafless flower stem, bearing a cluster of flat-margined, tubular flowers of gay purple, red or yellow tints. Many variations have been produced by cultivation, and their quick response to care, as well as their beauty and fra-

CYCLAMEN

grance, renders them popular as house plants. The true primrose, or English cowslip, is the parent of many cultivated flowers, but wild it bears only yellow flowers. It is loved for its early and prolific blooming. The cyclamen, common in cultivation, is a genus of the same family and is popular because of its beautiful foliage and flowers. The name



EVENING PRIMROSE

means "rabbit's ears" and the reflexed petals of purple, magenta or white are strikingly like the inquisitive, pricked ears of the cottontail. The leaves are large, hairy and light green with reddish markings. Under them the flower stems and buds form all unseen, but when the flowers are ready to bloom the stems lengthen rapidly so that the showy flowers are high above the circle of leaves. After several days the stem coils and pushes its tip below the ground, where the fruit ripens. The cyclamen is native in Eastern countries. The evening primrose is a member of a separate family and is not a true primrose.

Prince, Edward Ernest (1858-), a Canadian public official, born in Leeds, England, and educated at the universities of St. Andrews, Edinburgh and Cambridge. Under the auspices of the Scottish Fishery Board, he investigated the life history of marine food fishes and later, under the auspices of the United States Science Fund, he carried on morphological researches. On Oct. 1, 1892, he was appointed commissioner of fisheries of Canada, and he has since served on numerous fisheries commissions and done much to benefit the Canadian fishing industry.

Prince Albert, a city of Canada in the Province of Saskatchewan, on the North Saskatchewan River. It is the terminus of the Canadian Northern, Canadian Pacific, Grand Trunk Pacific and branch-line railways, 250 m. n. of Regina. There is a steamer service on the river. The city is surrounded by a farming community and a large area of spruce woods, and is the headquarters of a judicial district, a provincial penitentiary and of the Royal Northwest Mounted Police for Central Saskatchewan. Among the important buildings are hotels, schools, a collegiate institute, a convent, a business college, a hospital, churches and cathedrals. The leading industrial establishments include lumber mills, boat-building yards, wholesale houses, flour and planing mills, a cold-storage plant, marble and granite works and manufactories of culinary articles, extracts, cigars and saddles. Population in 1911, 6254.

Prince Edward Island, an island in the Gulf of St. Lawrence constituting a province of the Dominion of Canada. The island lies in a semicircular bay, forming a southern projection of the gulf, and is separated from the mainland by Northumberland Strait, which varies in width from 9 to 30 m. The

greatest length of the island is 145 m., its greatest width is 34 m. and the area is 2184 sq. m. Population in 1911, 93,722.

Surface. The outline is very irregular and the island is separated into three divisions by indentations of the coast. These are Hillsborough Bay and Halifax Bay on the south, and Richmond Bay on the north. Richmond and Halifax bays nearly meet, and at high tide the dry land between them is less than a mile and a half wide. Along the south shore, facing the strait, is a range of low cliffs of red sandstone. Extending across the central part of the island in a north and south direction, between Summerside and Charlottetown, is a range of hills which in places attain a height of 500 ft. With these exceptions the surface is low. The north shore is characterized by long, sandy beaches, which are favorite resorts during summer.

Industries. The climate is cool and temperate, but milder and more even than that of the mainland in the same latitude. The rainfall is ample for agriculture. The soil is a sandy loam of reddish color and is kept in a good state of fertility by applications of mussel mud dredged from shallow bays and tidal streams. Agriculture is the leading industry, wheat, oats, potatoes and other staple crops being grown. Dairying is a thriving industry and large quantities of butter and cheese are made. Beef cattle and hogs are also a good source of income to the farmer. Nearly all the farmers own their land, and, although the farms are small, their owners are financially in comfortable circumstances. Owing to the extended coast line the fisheries are important and in proportion to the population exceed in value those of some of the larger provinces. The annual catch of all varieties amounts to about $1,500,000. The fish taken in large quantities are herring, cod, mackerel and smelt. Lobsters and oysters are also a valuable source of income. About one-third of the island is covered with forests, in which beech, birch, maple, pine, spruce and cedar are found, and some attention is given to lumbering. Pork packing and canning lobsters are carried on, and there are a few manufactories of boots and shoes, tobacco and condensed milk.

Transportation and Communication. A branch of the Intercolonial Railway, owned and operated by the Dominion Government, extends the entire length of the island and has branches running to Georgetown, Charlottetown, Murray Harbor and Cape Traverse. Throughout the province the wagon roads are good. Practically every village has telephone communication, and during the summer Charlottetown has steamer communication with the ports of New Brunswick and Nova Scotia and the Atlantic ports of the United States.

Government. The chief executive is a lieutenant-governor, appointed by the governor-general of Canada for five years. The Legislature consists of an assembly of 30 members. The province is represented in the Canadian Parliament by five members in the House of Commons and four senators.

Education. The public schools are under control of a minister of education, who is a member of the provincial cabinet. Attendance upon elementary schools is compulsory. The Prince of Wales College at Charlottetown is affiliated with a normal school. In the same city are St. Dunstan's College and an advanced high school under control of the Catholic Church.

Cities. The chief cities are Charlottetown, the capital; Summerside and Georgetown.

History. The island was first seen by Jacques Cartier in 1534, but he believed it to be a part of the mainland. Later voyagers found it to be an island, and it was named St. Jean; this name it bore until 1798, when it was given its present name in honor of the Duke of Kent, who was then commanding the British forces in North America. The French made several attempts to plant a colony upon the island, but without permanent success until after the Treaty of Utrecht. In 1758, after the capture of Louisburg, the Isle of St. Jean was oc-

cupied by the British. At that time it had about 4000 inhabitants. After it became a possession of Great Britain it was placed under the control of Nova Scotia until 1773, when it was given a separate government. The number of settlers increased rapidly and the province continued as a separate government until 1873, when it joined the Federation.

Prince of Wales. See WALES, PRINCE OF.

Prince Ru'pert, a city of Canada in the Province of British Columbia, situated on the northern end of Kaien Island, about 550 m. n. of Vancouver. It is the western terminus of the Grand Trunk Pacific Railway, and of all the ports of the Pacific coast it is the nearest to Alaska as well as to Japan. The harbor is landlocked, and with its straight and deep entrance facilitates the approach of the largest steamers. The adjoining region is rich in mineral, agricultural and forest resources. The site for the city was selected in 1906. By the following year it contained a post office, Prince Rupert and Annex hotels and three banks. Population in 1911, 4184.

Prince'ton, Battle of, an important battle of the Revolutionary War, fought Jan. 3, 1777. On Jan. 2 the Americans were stationed on the bank of the Assunpink, some miles south of Trenton. Cornwallis, with a large British force on the opposite shore, was planning, on the following morning, to capture the Americans or drive them into the Delaware. But Washington outwitted the British and evaded an engagement. Quietly marching his force to the northward, by a wide detour about Cornwallis's left wing, he left his camp fires burning to mislead the enemy. He thus encountered 2000 British under General Mercer on their way from Princeton to join Cornwallis. They were greatly surprised to find themselves face to face with the Americans; nevertheless a hard battle ensued. The British were outnumbered and routed, and many of their men and guns were captured. Washington then went into winter quarters at Morristown.

Princeton University, an institution of university grade located at Princeton, N. J. Its characteristics are the beauty of its campus, its highly developed dormitory system of undergraduate life, the honor system in examinations, its undergraduate self-government, its preceptorial method of instruction, its carefully devised curriculum of liberal studies, and the active loyalty of its alumni working through a graduate council.

Founded in 1746 by members of the Presbyterian Synod of New York as the College of New Jersey, and located at Elizabethtown. The college was soon removed to Newark, where it remained until 1756, when it moved to Princeton and was located in buildings previously erected for it. In 1896 the name was changed to Princeton University.

The university is organized in three departments, the academic, the school of science and the graduate school. The combined departments offer a large number of courses, there being over 200 in the graduate department alone. Princeton has been conspicuous as a leader in important movements in higher education. It was the first American college to make provision for regular instruction in chemistry and natural history. During the early years it numbered among its student body many who afterwards were prominent in founding the nation and guiding its affairs, among them James Madison, Aaron Burr, William Bradford, Philip Freneau, Henry Lee, William Paterson and Oliver Ellsworth.

Though nonsectarian, the university is under the auspices of the Presbyterian Church. The government is in the hands of a self-perpetuating board of trustees, of which the governor of New Jersey is president. There are 410,000 volumes in the library, the faculty numbers about 180 and the enrollment is over 1500. See EDWARDS, JONATHAN; MCCOSH, JAMES; PATTON, FRANCIS LANDEY; WILSON, WOODROW.

Printing, the art of making impressions of letters, figures and other characters upon paper, cloth, leather and

other surfaces. There are three methods of printing: from a raised surface in relief, as in type or woodcuts; from a sunken surface, as in copperplate engraving; and from a flat surface on stone, as in lithography. Owing to the ease and facility of inking the raised surface, most printing is from type.

History. It is claimed that the Romans knew the art of printing but feared to practice it because they believed the spreading of knowledge among the masses would be detrimental to the interests of the authorities and would cause uprisings. It is claimed by some that the Chinese printed on paper, with engraved wooden blocks, at least 50 years before the beginning of the Christian Era, but the art was not practiced to any great extent until nearly 1000 years afterwards, when the principal Chinese classics were printed for the Imperial College of Peking by this method.

Printing from movable type originated in Europe some time between 1424 and 1450. Two inventors, Johannes Gutenberg, of Germany, and Laurens Coster, of Holland, contended for the honor of being the first to introduce the system. The weight of evidence is with Gutenberg, and he is generally considered the inventor of modern printing. Doubtless Coster's work appeared at about the same time, but Gutenberg was the first to place printing on a commercial basis and make it a success. About 1453 he printed, at Mayence, a Bible, a few copies of which are still in existence. Printing presses were also installed at Haarlem and Strassburg at about this time. The introduction of printing into Rome, Venice, Florence and other parts of Europe followed. William Caxton introduced the art into England in 1476, and set up his press in the Almonry at Westminster. The first printing press set up in America was that in the City of Mexico, about 1540, and the first one in the United States was put up at Harvard College, Cambridge, Mass., in 1638. This press printed the first edition of John Eliot's famous *Indian Bible*, and was the foundation of what is now the University Press, one of the largest and best-known printing establishments in the world.

Processes. In printing there are three processes—composition, make-up, or imposition, and press work. To the first, as now practiced, stereotyping and electroplating should be added. See Stereotype; Electroplating.

Composition, or *Typesetting*. This is the first step in printing, and the typesetter is called a compositor. The stand for holding his type is known as a case. When the type are set by hand, they are placed in a small metal frame, called a stick, which holds about 15 lines of ordinary type. When this is filled, the compositor places the type in a long, narrow frame, extending on three sides, with a metal bottom, which is called a galley. After the type have been set, a rough copy, or impression, is taken from the galley, which is known as a proof (See Proof). The proof is read and corrected, then given to the compositor, who corrects the composition accordingly. After this has been done, the type is ready for the next process. When typesetting machines are used, the process is different. See Typesetting Machine.

Make-Up, or *Imposition*. This is done by taking the composed type from the galley in sufficient quantities to make a page of the desired size, and putting in the headlines, page numbers and running titles. This is all done on a table having a stone or iron top, so that the type can be hammered down level; the man who does this work is known as the stone man. An iron frame, called a chase, is provided for holding these paged type, which are wedged in, in order to keep them from falling out when the chase is removed from the table. The type and chase, when arranged for printing, constitute the form, which may vary in size from 1 to 128 pages, depending upon the size of the page, the size of the press and the work. Usually a form will contain 16 or 32 pages.

Press Work. Press work is the actual printing done on a printing press (See

PRINTING PRESS). Posters, circulars, books, pamphlets and country newspapers are usually printed from sheets, but newspapers and magazines having a large circulation are usually printed from a roll of paper, which, after being printed, is cut into sheets and folded by mechanisms on the printing press. Modern machines of this character, together with other devices, enable printing presses to print 160,000 copies of 16-page papers per hour, taking the paper from eight rolls. See NEWSPAPER.

COLOR PRINTING. One section of the printing press is usually devoted to the printing of colored supplements for the Sunday editions of the large daily newspapers. On some presses a large number of colors can be printed. For most color printing what is known as the three-color process is employed. Three plates are made, each for printing one of the three primary colors, red, blue and yellow. Each plate is so made that the desired shade of its respective color is impressed upon the paper. The colors are printed one over the other usually in the order of yellow, red and blue, and in this way all the different colors in the picture are produced. When the four-color process is employed, black is added to the colors named, but the plates are prepared on an entirely different plan.

Printing Press, a machine for printing upon paper or other material. The first printing press designed by Gutenberg, the inventor of movable type, was a very primitive affair and rudely constructed, principally of wood. It was a modification of the wine press and consisted of a bed upon which the forms were placed, a board, for a platen, and a wooden screw, operated by a lever, for pressing the platen down upon the type. For inking the type, a soft leather ball, stuffed with cotton, was used, and the paper was laid upon the form and the platen placed over it; then the form was placed under the screw and the pressure exerted, after which the screw was reversed and the printed paper removed. This operation was repeated for printing each sheet. Presses on this principle continued to be used until the 17th century. An improvement on this press was made by Earl Stanhope about 1804, whereby levers with a toggle joint replaced the screw.

In 1816, George Clymer of Philadelphia made other vital improvements. His press, known as the Columbian, was operated on a different principle, that of bringing steel-pivoted jaws together by means of a crank and levers. This press was operated by two men and had a capacity of not over 180 impressions an hour. The Washington press, perfected by Samuel Rust of New York, made with an iron frame and similar in principle to the Stanhope press, came into use about 1827, and on his press much of the earlier printing in the United States was done. To Friedrich König is due the invention of the cylinder press, with self-inking rollers. In this press the form is placed on a bed which moves back and forth, the paper being held on the cylinder, which acts as a platen. The paper sheets are fed one at a time into the press by being laid on the cylinder, when movable tapes grip them and carry them around the cylinder, under which moves the form containing the type. This press was first used in printing the London *Times* in 1814, with a capacity of 800 impressions an hour, and many of a similar pattern have been used since in printing country newspapers in the United States.

In 1825 Sir Rowland Hill of England designed a printing press, the first of its kind, known as the web-perfecting press, which printed from a continuous roll of paper on both sides, and contained devices for cutting the web into sheets and folding them. This press was not considered a success, probably because the paper was of insufficient strength. In 1847 Richard M. Hoe of New York invented a rotary press, wherein the cylinder carried the form, which was made up of special type to fit the curvature of the cylinder and provided with strips to hold the type in place. This press printed on one side only and on sheets of paper. In 1865 William Bullock of

Philadelphia made the web-perfecting press of Sir Rowland Hill practical, and in 1879 Walter Scott of Chicago, together with other Americans, made various and numerous improvements in this type of press, which has been carried to such perfection by the manufacturers that it is now in general use for printing daily papers in large cities.

Presses of this pattern employ stereotyped plates made in halves, which are bolted to the cylinder. By having two cylinders so placed that the web of paper is fed between them and a platen roller, both sides of the paper can be printed at once, and by having a multiplication of these sets and separate webs of paper from rolls fed through them, increased capacities are obtained. When two or more distinct machines are geared together and the feeding mechanisms connected in one construction, they are known as quadruple, sextuple and octuple presses. An octuple press, constructed in 1909, uses paper when running to full capacity from eight rolls, each four newspaper pages wide, and requires 125-horsepower to drive it. This machine will consume in an hour about 464 m. of paper the width of a newspaper page. In addition to the eight rolls, other rolls are arranged in position on a turntable or reel, so that by the swinging of an electric switch, they come exactly into the place of the depleted rolls, and the new roll of paper is quickly pasted to the end of the exhausted one without interruption of the printing. The capacity of such a press is 160,000 per hour of newspapers having 16 pages or less, and 80,000 per hour for 32 pages. These papers are printed, folded and counted by special devices within the press, and conveyers or endless belts are arranged to carry them away for distribution.

For job printing and small commercial work, the Gordon press, the invention of George P. Gordon of New York, in 1850, has been extensively employed in various modifications. It is usually operated by a treadle working a crank, which causes a platen to vibrate to and from a form of type, inked by rollers moving over them, after receiving the ink from a revolving metal disk. The sheet of paper is placed on the platen and removed by hand. For rapid work the Harris high-speed automatic rotary press has been introduced and used in recent years. This machine prints from cylinders on separate sheets fed automatically by machinery, and is adaptable for printing in colors. It has a perforating device by which both longitudinal and cross perforations may be made. It is employed in printing tickets, checks, street-car transfers, coupons, counter sales, checks, waybills, money orders, loose-leaf manifold sheets and trading stamps. See NEWSPAPER; PRINTING.

Prison, *Priz 'n,* a place for the confinement or compulsory restraint of persons after arrest or sentence by arbitrary authority or process of law. Prisons have been used from antiquity as places of detention or seclusion, but only in modern times as places of punishment for crime. In the early part of the 19th century the most advanced examples of prison construction and discipline were to be found in the United States, but this country has not since kept pace with the leading nations of Europe. Reform began with the building of the Auburn State Prison of New York in 1816 and the Eastern Penitentiary in Philadelphia a year later.

Places of imprisonment in the United States include police stations, jails and prisons proper. These lockups are supported by the city or town and are for the detention of arrested persons, pending trial before the magistrates. Persons convicted of misdemeanors are confined in the county jails which are maintained by each county. Presumptive felons bound over to the grand jury are kept in the county jail before trial and if sentenced are confined in the state penitentiaries. In most states and large cities there are also reformatories for younger delinquents.

Since John Howard exposed the evils prevalent in British prisons in the latter part of the 18th century, there have been

many reforms in the management of prisons and the treatment of prisoners. In 1877 the Prison Association of New York authorized the erection of the reformatory at Elmira, and that institution has done much by its humane methods towards reclaiming its inmates and sending them forth honest and industrious men. Similar methods are now employed in other institutions.

Prisoners of War, persons captured from the enemy during war. Civilized nations hold prisoners of war in confinement until the war is ended, release them on parole or exchange them. Persons that have been exchanged may reenter the army. See PAROLE.

Pritch'ett, Henry Smith (1857-), an American astronomer and educator. He was born at Fayette, Mo.; graduated at Pritchett College, Glasgow, Mo., in 1875; and, after studying astronomy in the United States Naval Observatory, became assistant astronomer there in 1878. In 1880 he was made astronomer at Morrison Observatory, Glasgow, Mo., and three years later at Washington University, St. Louis. He was astronomer of the Transit of Venus Expedition to Auckland, New Zealand, in 1882, and made other observations at Sydney, Singapore and Hongkong. In 1897 he became superintendent of the United States Coast and Geodetic Survey; and was president of the Massachusetts Institute of Technology from 1900 to 1906, when he was chosen president of the Carnegie Foundation for the Advancement of Teaching.

Pri"vateer'. See MARQUE AND REPRISAL, LETTERS OF.

Priv'et, or **Prim,** a European shrub of the Olive Family, planted in the United States for ornament or for hedges. The branches are long and spreading; the leaves, smooth, without lobes and with short stems. The flowers grow in loose clusters and appear early in the summer. The corolla is tubular and white in color. The fruit which follows is a black, four-seeded berry. Privet is commonly found in the Old World on lawns or along garden borders, the small but thick leaves, thickly set upon the branches, giving it a pleasing form for hedgerows.

Priv'y Council, in England the assembly appointed by the sovereign to give advice on matters of State. The name first appears during the reign of Henry V, and in the time of Henry VI this became the official title. The list of privy councilors now embraces besides the princes of the royal family, the members of the cabinet, the Bishop of London, the two archbishops, the judges of the House of Lords, judicial committee and the Court of Appeal. The body is styled collectively "His Majesty's most honorable Privy Council," and a council can be held only under the presidency of the sovereign. Ireland has her own Privy Council, but the Council of Scotland was merged in that of England in 1708.

Pro'bate Court, an established court in the counties of every state, which has jurisdiction over the proof of wills, guardianship of children and the settlement of estates. In England it dates from the Court of Probate Act of 1857. Previous to this the probating of wills was under the jurisdiction of ecclesiastical courts, at the head of which was the Archbishop of Canterbury.

In the United States, Probate Courts are courts of record, in most of, if not all, the states, and issue processes and execute their decrees by appropriate officers in the same manner as the common-law and Chancery courts. An action to set aside the probate of a will of real estate may be maintained in a Federal court when the parties on one side are citizens of a different state from the parties on the other side. Probate in solemn form, that is, after due notice to all interested parties has been given, is the universal form in use in the United States. Wills of real property must be separately proven in the proper Probate Court in each state in which the real property is situated, unless the state statute dispenses with such probate. Copies of the will and probate must also be filed in the office of the registrar of

deeds of each county in the state in which the real property belonging to the testator is situated.

Procedure, *Pro se' dure,* in law, the successive steps in conducting a law suit, and the rules governing these steps. Procedure can be classified under two general heads: civil procedure, which has for its object the recovery of private rights, property or damages; and criminal procedure, which has for its object the punishment of those who commit crime. The first step in civil procedure is issuing a writ by the attorney for the party desiring the restoration of his rights and property and who thereby becomes the plaintiff in the suit. The writ summons the party against whom it is issued, and who becomes the defendant in the suit, to appear in court and show cause why the claims of the plaintiff should not be granted. The next step is entering an appearance in court by both parties. When this is done suit may be commenced. The next step consists of the pleadings, in which the attorney for each party to the suit sets forth in legal form the position of his client. If the facts are admitted and the question is one of law, the issue is argued, and following the argument the decision of the court or judgment is rendered. If the suit is one in which the facts are contested, these are determined by a jury, which renders its decision on the evidence presented. The court then pronounces judgment; that is, states the effect of the findings by the jury.

The first step in criminal procedure is the arrest of the offender; the second is a preliminary examination of the offender, the result of which is his discharge or commitment for further investigation. In the latter case he may be released on bail or confined in jail. The second examination is by the grand jury. If the evidence leads to a reasonable conclusion that the person committed the crime, an indictment is drawn against him. He then must be tried by a jury, which decides the case on the weight of the evidence. If found guilty, he is sentenced by the court.

In a civil suit the defeated party may apply for an appeal to a higher court, which is granted if the cause for the appeal is sustained before the court. In a criminal suit the defendant, if convicted, may apply for an appeal, but if he is found not guilty the State cannot appeal.

Proc'ter, Adelaide Anne (1825-1864), an English poet, born in London, daughter of Bryan Waller Procter. Using the pen name Mary Berwick, she contributed verses to *Household Words,* and attracted the attention of Dickens, who assisted her in publishing her productions. Her poems also appeared in *All the Year Round* and were finally collected under the title, *Legends and Lyrics, a Book of Verse.* The tenth edition, that of 1866, contains a memoir by Charles Dickens. Tenderness, depth of feeling and genuine sympathy are the qualities which predominate in her work. She is the author of the favorite song, *A Lost Chord.*

Procter, Bryan Waller (1787-1874), an English poet, better known as Barry Cornwall, born at Leeds. He was an intimate friend of Peel, Byron, Leigh Hunt and Charles Lamb, and many of his productions, chiefly his literary appreciations, were inspired by these friendships. He wrote *Dramatic Scenes and Other Poems, Marcian Colonna and Other Poems, A Sicilian Story and Other Poems, Mirandola, The Flood of Thessaly* and *Essays and Tales in Prose.* His songs were lyrical and revealed in their varying themes a wide range of interest.

Proctor, Alexander Phimister (1862-), a Canadian sculptor, born and educated in Ontario. He studied for his profession in New York, London and Paris, and exhibited at the Paris Exposition, for which he designed the quadriga for the United States pavilion. Besides his groups for the Pan-American Exposition, he has important works in the parks of New York and Denver, in Pittsburgh, in Buffalo, where the lions of the McKinley monument were designed by him, and at Princeton University, for which he designed "the Prince-

ton tigers." Moreover, his equestrian statue of Joliet was displayed at the Louisiana Exposition.

Proctor, Richard Anthony (1837-1888), astronomer and author. He was educated at King's College, in London, and at Cambridge. He spent the early part of his life in literary pursuits, writing particularly for the *Popular Science Review*. He was afterwards editor of *Proceedings* of the Royal Astronomical Society. He did important work in the study of the transits of Venus. Later he lectured in America and finally made his home in Missouri. His writings have been especially acceptable to the reader of popular astronomy. Among his books may be mentioned *Other Worlds Than Ours, The Romance of Astronomy, Half Hours with the Telescope* and *Easy Star Lessons*. See VENUS; ASTRONOMY.

Produc'tion, a term used in political economy to denote the creation of wealth by an increase of utilities. The theory is that man can neither create nor destroy matter; but that by labor he can so change many forms of matter as to make them more useful. For instance, a pane of glass is more valuable than the sand and other ingredients from which it is made, because the glass is more useful. Wealth may be created by change of the forms of matter, by change of place and by change of time. The glass is of different form from the materials from which it is made. Water on the Great Lakes is not wealth because it is so abundant, but in the arid regions of the United States, where it has to be brought a long distance, it is of great value. In winter a block of ice would not be wealth to a Wisconsin farmer because he can obtain all he needs without cost, but if the ice is kept until summer, a value has been placed upon it .

The factors employed in production are natural agents, such as land, air and water; capital or wealth saved and used in further production; and labor, by whose agency the form of material is changed.

Prof'it Shar'ing, an industrial arrangement by which wage earners receive a share in the profits of an enterprise in addition to their wages. It differs from cooperation in that it involves a mutual relationship between employers and employees and the control of the industry remains with the former. In a profit-sharing system, capital receives interest, employers or overseers receive salaries, and wage earners receive wages; what remains in the way of net profits is divided between these classes according to some accepted plan. The term is also used loosely to include many forms of addition to wages, such as bonuses, benefits and insurance, and social and educational funds. France has been more successful than any other nation with profit-sharing enterprises. In the United States they have not been developed to any great extent. See COOPERATION.

Progres'sive Party. See POLITICAL PARTIES IN THE UNITED STATES, subhead *Progressive Party*.

Prohibition, *Pro" hi bish' un,* the term applied to legislation which has for its purpose the abolishing of the manufacture and sale of alcoholic and malt liquors. Before the Civil War there was no general movement towards prohibition in the United States. However, previous to this, a few states had enacted prohibitory laws. These were Maine (1846), Massachusetts, Rhode Island and Vermont (1852), but later in Massachusetts and Rhode Island these laws were repealed. In Maine the law was incorporated with the constitution. The law in Vermont was repealed in 1903. In 1915 the following states were under prohibition laws: Arizona, Colorado, Georgia, Kansas, Maine, Mississippi, North Carolina, North Dakota, Oklahoma, Oregon, Tennessee, Virginia, Washington and West Virginia. Many states in the southern, central and western parts of the country had local option laws, which permit a township, city, village or county to vote upon local option. Since the beginning of the 20th century prohibition sentiment has spread rapidly. In December, 1917, Congress passed a resolution submitting

to the states an amendment to the constitution providing for the suppression of the liquor traffic one year after the ratification of the amendment by the required 36 state legislatures. By January, 1919, practically all of the states had ratified the amendment and it became a law, effective since January, 1920.

Prome'theus (forethought), in Greek myths, a Titan, brother of Atlas and Epimetheus and father of Deucalion. In his zeal for the welfare of man, Prometheus stole fire from heaven in a hollow staff and brought it to earth. To punish this insolence, Jupiter not only created ruinous Pandora (See PANDORA), but had the Titan bound to a pillar on Mt. Caucasus, where a vulture gnawed on his liver, the consumed parts of which grew again in the night. After centuries, Hercules killed the vulture and freed the heroic sufferer.

Prom'issory Note, an unconditional written promise to pay a specified sum of money at a designated time. If it is payable to order or to bearer it is negotiable. The following is the ordinary form of such an instrument:

Chicago, July 15, 1913.

$500.00

Sixty days after date I promise to pay to the order of John Smith Five Hundred Dollars, at the First National Bank, for value received, with interest at the rate of six per cent per annum. JOHN DOE.

The signer of the note is known as the *maker;* the one to whom the promise is made is the *payee.* The payee may transfer the note by indorsing it, that is, by writing his name across its back. The indorsers of a note are liable for its payment, if notified of its nonpayment when due. This is usually done by means of the *protest.* See NEGOTIABLE PAPER.

Prong'horn", or American An'telope, a species of the Bovine Family, found in southwestern United States and there frequently, though not accurately, known as the antelope. It receives its name from the short prong which branches from the curving horn. The pronghorn differs from the antelope principally in the fact that the former sheds its horns annually, like the deer, and, like the giraffe, has a hairy covering on the lower part of the horn. The color of the pronghorn is light brown, with dull white patches upon chin, cheek and throat and a brilliant white mark at the rump. Its build is graceful and so well arranged for speed that the pronghorn can outstrip fleet dogs and horses; but its lack of endurance and inability to jump over obstacles over two or three feet in height render it rather easily captured. Its most noticeable characteristics are its curiosity, which often leads it into snares, and its timidity, which drives it into panic upon the slightest provocation.

Proof, in printing, a trial sheet taken for the purpose of correcting errors which may have occurred in the composition or typesetting. The first proof taken is the "rough proof." This is read and the corrections are noted on the margin. The sheet is then given to the compositor, who proceeds to make the corrections in his type. A second proof, called the "revise" or "clean proof," is then taken and read for the purpose of checking the corrections indicated on the first proof. In printing newspapers and other current matter, only two proofs are taken, but matter intended for books usually requires four or five proofs to insure the removal of all errors. Proofs are taken of engravings, half tones and zinc etchings the same as of printed matter.

Proof reading is an art which requires special training on the part of those who engage in it. The proof reader must have a thorough knowledge of English, of the technicalities of printing, and an aptitude for detecting errors in spelling, punctuation and type. A system of signs which constitute a sort of shorthand is used in correcting proof. See PRINTING.

Proserpine, *Pros' er pin,* (in Greek, Persephone, *Per sef' o ne*), in classical myths, daughter of Jupiter and Ceres. While sporting one day in the Vale of Enna, she was espied and loved by Pluto, who seized her unawares, carrying her to Tartarus, where, as his bride, she became queen of the realms of the

dead. Ceres sought her daughter, sorrowing, through all the world. Returning to Sicily, she learned the whereabouts of her child from the nymph Arethusa, and immediately appealed to Jupiter for her restoration, which was to

PROSERPINE

be made, Jove promised, provided Proserpine had tasted no food while in Hades. As the maiden had sucked the pulp from six pomegranate seeds, a compromise was effected. Six months of each year she was to pass on earth with her mother—spring and summer. Fall and winter she was doomed to pass underground with her husband. Proserpine, representing the seed corn, makes the meaning of this fable very simple.

Protag'oras (about 485-411 B. C.), an early Greek philosopher, born at Abdera in Thrace. He was the first of the Sophists and the first who taught for a financial consideration. He went to Athens, probably about the middle of the fifth century B. C., where he enjoyed the intimate friendship of Pericles and won a great reputation as a teacher. Accused of atheism, he was banished from Athens and his writings were burned. His famous apothegm, "Man is the measure of all things," has become the common property of the world's philosophy and literature. He did not believe in science, for he claimed that man could determine from his own subjective impressions what things are and what things are not. Plato wrote *Theætetus* and *Protagoras* in refutation of his teachings. See SOPHISTS.

Protec'tion. See TARIFF.

Proteids, *Pro' tee idz,* a term given to several animal and vegetable compounds consisting chiefly of carbon, hydrogen, oxygen, nitrogen and sometimes sulphur and phosphorus. They are found in nearly all vegetable and animal organisms, but are formed exclusively in plants, undergoing but a slight modification when consumed by animals. Mankind derive their proteids from the nitrogenous foodstuffs in grains, vegetables, eggs, milk and the flesh of Mammals, birds and fishes. Proteids are the essential foodstuffs and the constituent of muscle and flesh.

Pro'test. See NEGOTIABLE PAPER.

Prot'estantism, the name applied to the system adopted by the leaders of the Reformation of the 16th century, since then used generally to include the Western Christian churches outside the authority of the Roman Catholic Church. The name Protestant was first used when the adherents of Luther *protested* against the decree of the Second Diet of Speyer (Spires), in 1529. This assembly took away from the non-Catholic princes and cities the right to determine what form of religion should be fol-

lowed in their domains and made certain restrictions in regard to the teaching of the new doctrines. The decree was followed by a formal protest from six of the German princes and a large number of cities of the empire, after which the Reformers were known generally as Protestants.

Pro'toplasm, a name formerly used to indicate the liquid body of a plant or animal cell without the nucleus, now used as referring to the entire cell body whether granular or liquid. In physical characteristics, it is colorless and translucent, thickened by the presence of granular bodies which are either held suspended in the liquid portion or form a spongy mesh which retains it. Chemically the dead cells are known to contain much protein, but from the records of various investigations it is believed that the living protoplasm undergoes frequent, if not continuous, chemical change. Protoplasm is the matter which exhibits the phenomenon of life and is therefore spoken of as the physical basis of life.

Pro"tozo'a, the lowest branch of the animal kingdom. It comprises all animals made up of single cells or of groups of undifferentiated cells. In this respect the Protozoans are sharply distinguished from the great group known as the Metazoans, which includes all animals whose structure consists of differentiated cells. On the other hand, this division, Protozoa, does not present a marked distinction between animal and plant life, and many forms of life classed by zoologists as Protozoans are classified by botanists as low species of plants. Among some scientists all one-celled forms of life, whether plant or animal, are united in a group known as Protista.

The Protozoans are all microscopic in size and are generally aquatic; some, however, live as parasites in the bodies of higher animals. Many, early in their life history, become permanently attached to some support which they never leave; these necessarily dwell in the water and obtain their food as it is brought to them in the currents of the streams. Others have tiny, hairlike projections called cilia, or flagella, by movement of which they produce currents in the water or move their own bodies; the amœba, which is probably the best-known Protozoan, moves by temporarily extended processes. While most members of this class are merely naked cells, some have produced a shell-like covering. Such differences as these, however, have come about through slight differences in the protoplasm of which the cell is composed and not through a development of cells into tissues or organs.

Reproduction is by simple division of the cells or a process known as budding, whereby a protuberance put forth by the parent cell breaks off and becomes a separate individual. Once in three or four generations a conjugation of two cells takes place and is a necessity to the continuation of the species.

There are many systems of subdivision of this group, each of which has its commendable features. The four classes most commonly recognized are known only by technical names, Sarcodina, Mastigophora, Sporozoa and Infusoria. The third class, Sporozoa, includes many species which are now recognized as the cause of diseases both of man and of the lower animals. See INFUSORIA; AMŒBA; GLOBIGERINA; ZOOLOGY.

Proudhon, *Proo" don'*, **Pierre Joseph** (1809-1865), a French socialist and political writer. By virtue of the linguistic knowledge which he gained in the printing trade, he was enabled to write an *Essai de grammaire générale,* for which the Academy of Besançon conferred upon him, for three years, a pension of 1500 francs. In 1840 appeared his political economy, in which he defined property as theft, and for writing which he was prosecuted. He was subsequently associated with a water-transport system, various newspapers and a bank. He was a leader in the Revolution of 1848 and was a member of the Constituent Assembly.

Provençal, *Pro" ven sahl'*, **Language.** See LANGUAGE, subhead *Modern Romance Languages.*